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Volume XXVIII-No. 8 August, 1955

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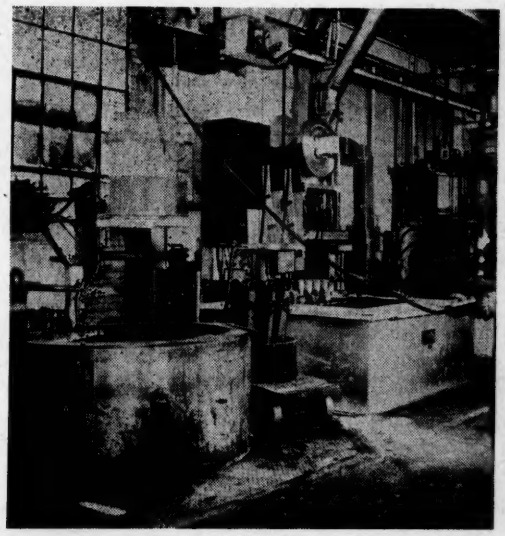

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Flame Characteristics and Fire Potential with Heavy Charge Quenched in Oil

A 750-lb. charge is cooled in approximately 5 minutes with no greater temperature rise than from 5°—10°F., depending on the temperature used. In this installation, therefore, the power consumption is the power used on the motor driven pumps which use 1.11 KWH per hour for the three pumps under full load with 450-gallons per minute velocity.

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PUBLISHERS OF: Metal Progress, Metals Review, Metals Handbook, Transactions

Metals Review

VOLUME XXVIII, 8 August, 1955

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Invitation to Entrants . . . .

10th Metallographic Exhibit

Entries are invited in the 10th A.S.M. Metallographic Exhibit, to be held at the National Metal Exposition in Philadelphia the week of Oct. 17 through 21, 1955. Entries will be displayed to good advantage and awards will be given for the best micrographs as decided by a committee of judges.

Awards and Other Information

A committee of judges will be appointed by the Metal Congress management which will award a First Prize (a medal and blue ribbon) to the best in each classification. Honorable Mentions will also be awarded (with appropriate medals) to other photographs which, in the opinion of the judges, closely approach the winner in excellence. A Grand Prize, in the form of an engrossed certificate and a money award of $100, will also be awarded the exhibitor whose work is adjudged best in the show, and his exhibit shall become the property of the American Society for Metals for preservation and display in the Society's National headquarters in Cleveland.

All photographs may be retained by the Society for one year and placed in a traveling exhibit to the various Chapters. They will be returned to the owners in May 1956 if so desired.

Classification of Micros

BLACK AND WHITE PRINTS

1. Carbon and alloy steels
2. Stainless steels and heat resisting alloys
3. Iron, cast and wrought
4. Aluminum, magnesium, beryllium, titanium and their alloys
5. Copper, nickel, zinc, lead and their alloys
6. Metals and alloys not otherwise classified
7. Series showing transitions or changes during processing
8. Welds and other joining methods
9. Surface phenomena
10. Results by unconventional techniques (other than electron micrographs)
11. Slags, inclusions, refractories, cermets
12. Color micros (prints; no transparencies accepted)

Rules for Entrants

Work which has appeared in previous metallographic exhibits held by the American Society for Metals is unacceptable. Photographic prints shall be mounted on stiff cardboard; maximum dimensions should be limited to 15 by 22 in. Heavy, solid frames are not permissible because of difficulties in mounting the exhibit. Entries should carry a label on the face of the mount giving:

Classification of entry
Material, etchant, magnification
Any special information as desired

The name, company affiliation and postal address of the exhibitor should be placed on the BACK of the mount.

Transparencies will NOT be accepted.

Entrants living outside the U.S.A. should send their micrographs by first-class letter mail endorsed "Photo for Exhibition—May be opened for customs inspection." To be acceptable as first-class mail the package should measure no more than 35 x 45 cm. (14 x 18 in.)

Exhibits must be delivered before Oct. 10, 1955, either by prepaid express, registered parcel post or first-class letter mail, addressed to:

A.S.M. Metallographic Exhibit
National Metal Exposition
Convention Hall
Philadelphia 4, Pa.

37th National Metal Congress and Exposition

Philadelphia 4, Pa. — October 17 to 21, 1955

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SAGINAW VALLEY	Thomas E. Leontis Dow Chemical Co. Midland, Mich.	Vernon E. Hense Buick Motor Div. Flint 2, Mich.	Albert A. Moore 1727 South Sasse Rd. Route 4 Midland, Mich.	Harold R. Wegner Saginaw Heat Treating Co. 5801 Dixie Highway Saginaw, Mich.
SAN DIEGO	Thomas E. Piper Consolidated Vultee Aircraft Corp. Dept. I-14, Bldg. 19 P. O. Box 1950 San Diego 12, Calif.	Hugh M. Rush Rohr Aircraft Corp. Foot of H. St. Chula Vista, Calif.	Lawrence J. Hull 3446 Yonge St. San Diego 6, Calif.	George D. Cremer Research Div. Solar Aircraft Co. Pacific Highway San Diego, Calif.
SAVANNAH RIVER	C. C. McBride 118 Marion Dr. Aiken, S. C.	Sheldon P. Rideout 1700 Dupont Dr. Vanwood, Aiken, S. C.	E. A. Orr 821 Heard Ave. Augusta, Ga.	L. H. Eiseman, Jr. Apt. 8, Country Club Apts. Augusta, Ga.
SOUTHERN TECHNICAL INSTITUTE	Ronald Logan 512 Forstner Place Chattanooga 3, Tenn.	Jack Summer Route 4 Tifton, Ga.	Henry Almand 1917 College St. Macon, Ga.	Bruce Dillard 603 Webster St. Thomasville, Ga.
SOUTHERN TIER	John B. Given I. B. M. Corp. Endicott, N. Y.	T. F. Sharp Morse Chain Co. Ithaca, N. Y.	Samuel C. Smith 264 Caldwell Ave. Elmira, N. Y.	
SPRINGFIELD	L. Brewster Howard 36 Druids Lane West Springfield, Mass.	Donald R. Barber 170 Hartwick St. Springfield 8, Mass.	Francis D. Looney L and L Heat Treating Co. 349 Cold Spring Ave. West Springfield, Mass.	
SYRACUSE	Fred Hunter 1226 Cumberland Ave. Syracuse 10, N. Y.	J. A. Miskelly General Electric Co. Bldg. #3 Syracuse 6, N. Y.	James O. Ochsner 226 Cleveland Ave. Syracuse 8, N. Y.	Henry C. Holbert 2935 South Salina St. Syracuse 5, N. Y.
TERRE HAUTE	Burlin R. McMasters 1522 South 18th St. Terre Haute, Ind.	Karl E. Fenrich Allis Chalmers Manufacturing Co. Terre Haute, Ind.	Edward A. MacLean Rose Polytechnic Institute Terre Haute, Ind.	Lawrence E. Simpson 546 Monterey Ave. Terre Haute, Ind.
TEXAS	Donald E. Wilson Cameron Iron Works, Inc. P. O. Box 1212 Houston 1, Tex.	Russell F. Goff 7430 Buena Vista Houston 17, Tex.	Curtis L. Horn 4604 Cedar Oaks Lane Bellaire, Tex.	
TOLEDO	Lawrence R. Albright Industrial Heat Treating Co. 522 State St. Toledo, Ohio	Dean K. Seizert Ohio Fuel Gas Co. 231 Huron St. Toledo 1, Ohio	Calvin H. Cummings 4330 Beverly Dr. Toledo 14, Ohio	

CHAPTER	CHAIRMAN	VICE-CHAIRMAN	SECRETARY	TREASURER
TRI-CITY	Ralph W. Rogers, Jr. Aluminum Co. of America Davenport, Iowa	Phillip E. Goettsch Route 1 Bettendorf, Iowa	Richard B. Miclot Riverside Foundry Co. Bettendorf, Iowa	
TULSA	Paul Ogden 1119 South Johnstone Bartlesville, Okla.	George R. Clay 1519 East 20th St. Tulsa, Okla.	William L. Smith 4630 South Evanston Tulsa, Okla.	
UTAH	J. N. Carter 1549 Parkway Ave. Salt Lake City, Utah	Milton Marshall Brigham Young University 211 South University Ave. Provo, Utah	H. Edward Flanders 1519 Redondo Ave. Salt Lake City, Utah	Robert Kron Columbia-Geneva Steel Co. P. O. Box 311 Orem, Utah
VIRGINIA POLYTECHNIC INSTITUTE	William H. Lewis, Jr. Virginia Technical Station Box 4558 Blacksburg, Va.	Burton C. Boesser, II Virginia Technical Station Box 2854 Blacksburg, Va.	Richard A. Fritts Virginia Polytechnic Institute Virginia Technical Station Box 3654 Blacksburg, Va.	
WARREN	Harold O. Ripple R. F. D. 5, Box 12 Warren, Ohio	Eugene R. Heffner 584 Stanton Ave. Niles, Ohio	Howard Blair 888 Trumbull Ave., S.E. Warren, Ohio	
WASHINGTON	Melvin R. Meyerson National Bureau of Standards Northwest Bldg. Room 103 Washington 25, D. C.	N. C. Fick Executive Office of the President ODM—Materials Room 4498, 441 G St., N.W. Washington 25, D. C.	Jack H. Schaum 7309 Romander Lane Chevy Case, Md.	
WEST MICHIGAN	Robert L. Sweet Met. Eng. Dept. Michigan State University East Lansing, Mich.	Robert P. Campbell Wheelco Instruments Div. 900 Monroe N. W. Grand Rapids 2, Mich.	Warren B. Rice 2113 Maffett St. Muskegon Heights, Mich.	
WESTERN ONTARIO	Frank Miller Steel Master Tool Co. R. R. 2 Tecumseh, Ontario	B. J. Blair 758 Wilton Crescent Woodstock, Ontario	E. Backman Canadian Motor Lamp Co., Ltd. Windsor, Ontario	Raymond E. Barton Canadian Mines Equipment Ltd. 596 Hamilton Rd. London, Ontario
WICHITA	Louis G. Montre 1002 Parker Wichita 3, Kan.	Jonathan Ewert Coleman Co., Inc. 2nd and St Francis Wichita, Kan.	Charles E. Kimball 1109 South Inverness Wichita, Kan.	Harley E. Babst 731 West 10th St. Wichita 2, Kan.
WORCESTER	Herbert P. Berry Thomas Smith Co. 288 Grove St. Worcester 5, Mass.	Lincoln G. Shaw Pratt & Inman 12 Cherry St. Worcester, Mass.	Ralph N. S. Merritt, Jr. Olson Manufacturing Co. 100 Prescott St. Worcester 5, Mass.	
YORK	Roy E. Livingstone 1717 Stanton St. York, Pa.	John H. Fisher 716 Clayton Ave. Waynesboro, Pa.	Arthur R. Miller 983 East Philadelphia York, Pa.	Paul D. Strubhar R.C.A. Victor Div. Lancaster, Pa.

Los Angeles Panel Discusses Titanium

Members of the Panel Which Discussed "Design and Testing of Titanium Materials" at a Meeting Held Recently by Los Angeles Chapter Included, From Left: L. B. Stark, North American Aviation, Inc.; J. F. Baisch, Jr., Boeing Airplane Co.; James R. Long, Technical Chairman; L. A. Best, Douglas Aircraft Co., Inc.; and Willard W. Tjossem, Lockheed Aircraft Corp.

A panel discussion of the "Design and Testing of Titanium Materials" was presented recently before a meeting of the **Los Angeles Chapter.** Panel members were: J. F. Baisch, Jr., metallurgist, Boeing Airplane Co., L. A. Best, metallurgist, Dougas Aircraft Co., Inc., L. B. Stark, production design engineer, North American Aviation, Inc., and W. W. Tjossem, design engineer, Lockheed Aircraft Corp. J. R. Long, Harvey Machine Co., acted as technical chairman.

Mr. Long presented a brief history of titanium, from its beginning as a laboratory metal to its present state of development. He pointed out that many of the troubles plaguing the industry are the result of the use of hard sponge produced and melted at an earlier stage of titanium development. Later developments in sponge making and melting have made possible the production of high-quality sponge and ingot.

Mr. Best described the "tear test" utilized as a receiving inspection criterion for hydrogen embrittled sheet materials. This testing method was illustrated with a high-speed moving picture which recorded the progress of a tear in an acceptable sheet and a hydrogen embrittled sheet.

Mr. Stark discussed formability and fabrication testing of titanium alloys. Data on bend, joggle, stretch wrap, hydropress, hydroforming, drop hammer and dimple tests conducted on a number of heats of metal were presented.

Mr. Baisch described the welding of a titanium pressure vessel. He stressed the importance of the contributions of the shop personnel in the successful utilization of titanium alloys.

Mr. Tjossem discussed the utilization of commercially pure titanium and titanium alloys for high-temperature applications in the proximity of aircraft power plants.—**Reported by W. C. Hayes for Los Angeles.**

Peoria Elects Officers for 1955-56

From Left: J. W. Cantwell, Past Chairman, R. H. Van Pelt, Chairman, A. L. LaMasters, Vice-Chairman, and J. M. St. John, Secretary-Treasurer, Are Shown After Their Election at a Meeting of Peoria Chapter

Relation of Light Metals To Defense Explained at Meeting in Washington

Speaker: E. A. Harris

Office of Defense Mobilization

The **Washington Chapter** enjoyed two innovations at a recent meeting. It met for the first time in the Engineers' Club of Washington, and it deviated from its frequent practice of listening to a metallurgist discuss selected properties and reactions of metals and instead considered the problems of the supply and requirements of light metals during a national emergency. E. A. Harris, chief of the light metals division of the Office of Defense Mobilization spoke on "Light Metals and Defense" from the viewpoint of supply and requirements.

Basically there are several problems in the procurement of any material needed in an emergency. First, competent governmental agencies must determine what quantities will be needed for combined military and civilian uses, both at home and for export, during a time when all emphasis is on the emergency and many uses are curtailed or eliminated. Second, competent governmental agencies must estimate what supplies will be available, from domestic sources and from abroad, in an emergency when some normal sources may disappear. The deficit, and there is almost always a deficit in an emergency, must be met somehow. There are several lines of action that may be taken. One is to increase productive capacity; this has its limits. A second line is to curtail the less important uses, civilian and military, and distribute available supplies to the more important users. This is the method most used during active wars but it has the serious disadvantage of merely distributing the poverty of materials. Third, substitutions of one material for another can be made, usually ending in a poorer product. Fourth, there is the possibility of storing up during the fat years for the lean years feared ahead. This is stockpiling.

Mr. Harris stated that the analysis of these different procedures and problems lies, in the case of light metals, in a Light Metals Commodity Committee with a chairman from the Office of Defense Mobilization. For these metals, stockpiling has been decided to be necessary and is under way under the authority of several federal statutes. During the question period, the major concerns were "What is the quality, what is the stage of fabrication and what is the geographical distribution (or rather, availability to the prospective user) of the metals in the stockpiles?"—**Reported by H. E. Stauss for Washington Chapter.**

Talks at New Jersey On Atomic Energy — Now and in Future

Speaker: H. N. Alyea
Princeton University

Hubert N. Alyea, professor of chemistry, Princeton University, discussed "Atomic Energy" before the New Jersey Chapter at its "Family Night" meeting. His lecture, punctuated with a continual series of demonstrations, revealed that even after 200,000 people had worked for 4 yr., no one knew, up to 3 weeks before Hiroshima, that the atom bomb would work. The reactions employed to produce explosions up to that time had been chemical in nature, with the same elements existing before and after, though in different combinations.

The atom bomb, on the other hand, was dependent upon an actual change in elements or transmutation. This type of change, for so long the dream of the alchemists, is not something new. At least not to Mother Nature, for she has been changing uranium to lead since the beginning of the world. It remained a secret to man until a series of scientific investigations starting with Bacquerl's discovery in 1896 of the radiations given off by uranium. In the ensuing 50 yr., man's eternal curiosity and quest for knowledge has found for him a source of energy whose supply exceeds that of all our present fuels.

The United States Government, in its "Manhattan Project", was able to test whether the natural breaking up of uranium could meet two of the three requirements for an explosive—to give off energy and to be self-propagating. Ability to meet the third requirement, rapid release of energy, was not determined until the first explosion was successfully attempted in New Mexico just 3 weeks before it was used against Japan. But the bomb, in all its variations, is, or at least should be, only a part of the story of atomic energy. We now have new radioactive elements with countless uses in medicine and industry and a promise of cheap power. Already the Oak Ridge reactors (atomic piles), with their controllable energy, have given us radioactive material equivalent to 2 million lb. of radium. The value of this amount is even more startling when one considers that since Madam Curie's discovery of radium there have been only 4 lb. total of natural radium available for medical research. And the Oak Ridge production is not just radium but radioactive phosphorus, iron, iodine, strontium, etc., much more valuable to our doctors and industrial scientists. Radioactive strontium, for example, has been used for successful treatment of eye lesions and was used by Radio Corp. of America last year to generate electricity directly.

The giant of atomic energy offers both the means to destroy life and to save or extend life. Dr. Alyea expressed his strong conviction that the only course to avoid our own destruction would be complete demilitarization of every nation in the world, with the organization of a standing international army to use the atom bomb as a weapon to maintain peace. To reach this goal, Dr. Alyea proposed an increased effort by the political and social research fields to match the contributions of the natural scientist. The problems between nations are not to be solved by meetings; the political scientist will have to roll up his sleeves and work even harder in his field than the atom bomb scientist has in his. Dr. Alyea's hope is that the urgency brought on by the fantastic power of the atom bomb will force action in social and political research leading to an international code of living.—**Reported by E. L. Novemesky for New Jersey.**

Presents Gavel to Successor in Boston

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At the Election Night Meeting of Boston Chapter, Outgoing Chairman Morris Cohen (Right), Massachusetts Institute of Technology, Presents the Gavel to His Successor, John L. Morosini, of D. A. Stuart Oil Co.

New Haven Chapter Gavel Changes Hands

Past Chairman of the New Haven Chapter, E. Lovering (Left), Is Shown as He Handed Over the Gavel to the Newly Elected Chairman, Maur Weldon, During a Recent Meeting. (Reported by F. E. Storm for New Haven Chapter)

Complete Tenth Southern Metals Conference

Shown Below Are Members at a Typical Technical Session During the Southern Metals Conference. At left: O. E. Cullen, speaker, Walter A. Neisz, chairman, and A. B. Cooper, who was selected as chairman for next year's Conference, to be sponsored by the Carolinas Chapter

The **Chattanooga Chapter** was host to the tenth annual Southern Metals Conference June 1 to 3. The Conference, which is sponsored by the A.S.M. chapters from the southeastern part of the United States, was dedicated to the metals industry of the industrial south, with emphasis on "Production, Fabrication and Application of Metals".

Meeting at Lookout Mountain Hotel, the Conference had a total registration of 135, with representatives from the Carolinas, Chattanooga, Birmingham, Georgia, New Orleans, Oak Ridge and Savannah River Chapters present. The family aspect of the Conference was evidenced by the registration of 24 wives of members and at least 10 children, all of whom enjoyed the resort atmosphere of the hotel. Sightseeing, dancing and shopping tours were enjoyed by those attending.

The speakers for the Conference were representative of the fields to which the Conference was dedicated. R. F. Miller, United States Steel Corp., began the technical meetings by speaking on the "Properties of Metals at Elevated Temperatures" and W. S. Pellini, Naval Research Laboratory, spoke on "Factors Which Determine the Performance of Weldments".

The second day's session was given over to titanium, with talks by Julian Glasser, Cramet, Inc., on the "Production of Titanium", and Thomas W. Lippert, Titanium Metals Corp. of America, on "Fabrication and Application of Titanium". "Alloy Steels From the User's Point of View" by Richard D. Chapman, Chrysler Corp. and "Heat Treating Atmospheres" by O. E. Cullen, Surface Combustion Corp., were the subjects on the final day. Plant tours through Combustion Engineering, Inc. and Tennessee Products and Chemical Co. rounded out the technical side of the Conference.

A Tennessee fish fry served on the patio of the hotel was enjoyed Thursday night, with dancing afterward, and the banquet on Friday night, followed by dancing, brought the Conference to a close. Earle C. Smith, Republic Steel Corp., who gave the banquet address, spoke on "Men and Metals".

Looking toward the future of the Conference, a firm set of bylaws and objectives were adopted by the chairmen of the Conference Chapters which met during the Conference. The Carolinas Chapter's invitation to hold the conference in 1956 was accepted.—**Reported by J. H. McMinn, Chattanooga Chapter, for the Southern Metals Conference.**

Student Group Formed at Southern Tech

A Student Chapter Is Currently Being Organized at the Southern Technical Institute. Pictured are most of the original members of the group, including, front row, from left: Ronald Logan, chairman, Claud Wilson, Jack Weilaud and J. S. Disuke; second row, from left: Bruce Dillard, treasurer, Thomas Little, Eugene McCullough, Steve Borrell, James Wood, Jack Summer, vice-chairman, Fred Bennett, George Gautratuo, and Henry Almand, secretary. Not pictured are John Cawart, John Childs, Gerald Bell and Charles Young. (Reported by Ronald Logan for the Chapter)

IMPORTANT MEETINGS
for September

Sept. 6-16—Production Engineering Show. Navy Pier, Chicago.

Sept. 12-16—Instrument Society of America. 10th Annual Instrument Conference and Exhibit. Shrine Exposition Hall and Auditorium, Los Angeles. (Richard Rimbach, Secretary, I. S. A., 921 Ridge Ave., Pittsburgh 12, Pa.)

Sept. 25-28 — American Institute of Chemical Engineers. National Meeting. Lake Placid, Essex County, N. Y. (S. L. Tyler, Executive Secretary, A. I. C. E., 25 West 45th St., New York 36, N. Y.)

Sept. 26-29—Association of Iron and Steel Engineers, Annual Convention, Hotel Sherman, Chicago. (T. J. Ess, Director, A.I.S.E., Empire Bldg., Pittsburgh 22, Pa.

New Films

Air Power on Parade

A 16-mm. color and sound film, produced by Bendix Aviation Corp., "Air Power on Parade" is a documentary motion picture covering the National Air Show, and showing a massive demonstration of military air strength. The film may be borrowed from Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.

Coated Abrasive Belts

A film "Coated Abrasive Belts Speed Metalworking Production" shows newest finishing developments in the fast-moving coated abrasives field. Running 27-min., in sound and color, the film illustrates methods, machinery and product application and prepolishing techniques. It may be borrowed from Dept. FI, Behr-Manning Division, Norton Co., Troy, N. Y.

A Dawn's Early Light

A sound and color motion picture, filmed by Westinghouse Electric Corp. in cooperation with the Atomic Energy Commission and the Department of Defense, describes in story form, the practically unlimited uses for atomic power in our everyday living. Fred MacMurray and Fay Wray are featured in the story.

The film is available through the Westinghouse Film Library, Attention Miss Anna Mae Hennessey, Gateway 3, Pittsburgh 30, Pa.

As an indication of the tremendous dissemination of engineering information, a compilation shows that in one year the ASM collected, edited, published and distributed over *one hundred million pages* of metallurgical information.

To Head Milwaukee Chapter in 1955-56

Recently Elected Officers of the Milwaukee Chapter for the Coming Year Include, From Left: E. G. Guenther, Wisconsin Motor Corp., Secretary-Treasurer; G. J. Barker, University of Wisconsin, Chairman; and R. P. Daykin, Ladish Co., Vice-Chairman. (Photograph by C. David)

Columbus Elects Slate for New Year

Columbus Chapter's Officers for the 1955-56 Season Include, From Left: R. Ernest Christin, Secretary; Frank H. Beck, Past Chairman; J. Harry Jackson, Chairman; Haswell E. Staehle, Vice-Chairman; and Francis W. Boulger, Treasurer. (Photograph by J. H. Jackson for Columbus Chapter)

Worcester Greets Incoming Officers

Officers Elected at the Annual Meeting of the Worcester Chapter Include, From Left: Joseph C. Danec, Past Chairman; Ralph N. S. Merritt, Jr., Secretary-Treasurer; Lincoln G. Shaw, Vice-Chairman; Herbert D. Berry, Chairman; and Edward F. Grady, Secretary. (Photo by C. W. Russell)

American Society for Metals

Tentative Technical Program
National Metal Congress and Exposition
Philadelphia—Oct. 15-21, 1955

Monday, Oct. 17

9:30 a.m.

TITANIUM

Rate of Diffusion of Carbon in Alpha and Beta Titanium, by F. C. Wagner, E. J. Bucur and M. S. Steinberg, Horizons, Inc.

Hydrogen Contamination in Descaling and Acid Pickling of Titanium, by G. A. Lenning, C. M. Craighead and R. I. Jaffee, Battelle Memorial Institute.

Mechanical Properties of Ti-Cr-Mo Alloys as Affected by Grain Size and Grain Shape, by H. R. Ogden, F. C. Holden and R. I. Jaffee, Battelle Memorial Institute.

Investigation of the Heat Treatability of the 6% Aluminum-4% Vanadium-Titanium-Base Alloy, by R. G. Sherman and H. D. Kessler, Titanium Metals Corp. of America.

MECHANICAL PROPERTIES

Notch Ductile High Strength Nodular Irons, by G. A. Sandoz, H. F. Bishop and W. S. Pellini, Metal Processing Branch Metallurgy Division, Naval Research Laboratory.

Fatigue and Anistropy in Copper, by M. L. Ebner and W. A. Backofen, Metals Processing Laboratory, Massachusetts Institute of Technology.

Influence of Vibration on the Solidification of an Aluminum Alloy, by R. S. Richards, Titanium Metals Corp. and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

10:30 a.m.

CONFERENCE ON DUCTILE CHROMIUM METAL AND ITS HIGH ALLOYS

(Jointly Sponsored by Office of Ordnance Research, U. S. Army, and ASM)

WORLD WIDE RESEARCH ON DUCTILE CHROMIUM

Chairman: J. W. Dawson, Director, Chemical Sciences Division, of Ordnance Research, U. S. Army.

Introductory Remarks, by P. N. Gillon, Colonel, Ordnance Department, U. S. Army.

Research on Chromium in America, by W. J. Kroll, Consultant.

Research on Chromium in Australia, by Henry L. Wain, Department of Supply, Government of Australia.

Research on Chromium in Europe, by A. H. Sully, Fulmer Research Institute, England.

2:00 p.m.

PHYSICAL METALLURGY OF HIGH-CHROMIUM ALLOYS

Chairman: J. H. Holloman, Manager, Metallurgy and Ceramics Research Department, General Electric Research Laboratory.

Influence of Chromium Metal Purity on the Properties of Chromium Alloys, by Robert I. Jaffee, Battelle Memorial Institute.

Solubility of Nitrogen and Oxygen in Solid Chromium, by A. A. Burr, Rennselaer Polytechnic Institute.

Ternary System of Chromimum-Nickel Alloy Containing up to 5% Nitrogen, by N. J. Grant, Massachusetts Institute of Technology.

Oxidation of Chromium and Chromium Alloys, by W. Martin Fassel, Jr., University of Utah.

Kinetics of the Formation of the Sigma Phase in Chromium-Iron Alloys, by Pol Duwez and Howard Martens, California Institute of Technology.

2:00 p.m.

TITANIUM-ZIRCONIUM

Nature and Decomposition Kinetics of Alpha Prime in Titanium-Vanadium Alloys, by F. R. Brotzen, Rice Institute, and E. L. Harmon and A. R. Troiano, Case Institute of Technology.

Metallography of Tempering of Alpha-Prime in Titanium Alloys, by R. F. Domagala and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Tensile Properties of Zirconium-Chromium Alloys—Particle Strengthening Effects, by J. H. Keeler, General Electric Co.

Progress in the Development of Creep-Resistant Zirconium Alloys, by Walston Chubb, Battelle Memorial Institute.

4:30 p.m.

CONFERENCE ON VACUUM MELTED METALS

8:00 p.m.

CONFERENCE ON VACUUM MELTED METALS

Tuesday, Oct. 18

9:30 a.m.

TEMPERING OF STEEL

Some Effects of Silicon on the Mechanical Properties of High Strength Steels, by C. H. Shih, A. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

Some Relationships Between Endurance Limit and Torsional Properties of Steel, by S. T. Ross, R. P. Sernka and W. E. Jominy, Chrysler Corp.

Influence of Molybdenum and Tungsten on Temper Embrittlement, by A. E. Powers, Materials & Processes Lab, General Electric Co.

Hardness of Tempered Martensite in Carbon and Low Alloy Steels, by R. A. Grange and R. W. Baughman, United States Steel Corp.

DEFORMATION

Deformation of Beryllium Single Crystals at 25 to 500°C., by H. T. Lee and R. M. Brick, School of Metallurgical Engineering, University of Pennsylvania.

SEMINAR ON THEORY OF ALLOY PHASES

Saturday, Oct. 15

9:30 a.m.

Bonding Forces in Solids, by F. Seitz.

Band Theory of Bonding in Metals, by J. C. Slater.

Density of States as Determined by Soft X-Ray Spectroscopy, by C. H. Shaw.

2:00 p.m.

Intermediate Phases and Electronic Structure, by T. B. Massalski.

Crystal Structure and Atomic Size, by F. Laves.

Bonding Forces in Alkali Metals, by H. Brooks.

8:00 p.m.

Electronic Structure of Metals and Alloys, by L. Pauling.

Sunday, Oct. 16

9:30 a.m.

Intermediate Phases in Alloys of the Transition Elements, by P. Duwez.

Ferromagnetism, Antiferromagnetism and Crystal Structure, by C. Zener.

Atomic and Magnetic Ordering in Intermediate Phases, by J. S. Kasper.

2:00 p.m.

Atomic Moments of Transition Elements in Solid Solution Alloys, by C. Shull.

Solid Solutions and Ordering, by B. Averbach.

Alloy Phase Diagrams, by G. V. Raynor.

Grain Boundary Creep in Aluminum Bicrystals, by F. N. Rhines, W. E. Bond and M. A. Kissel, Carnegie Institute of Technology.

Deformation and Fracture Mechanisms of Polycrystalline Magnesium at Low Temperatures, by F. E. Hauser, P. R. Landon and J. E. Dorn, University of California.

Influence of Cold Work on Strength of Steel at Elevated Temperatures, by Paul Shahinian, Metallurgy Division, Naval Research Laboratory.

CONFERENCE ON DUCTILE CHROMIUM METAL AND ITS HIGH ALLOYS

Chairman: A B. Kinzel, Vice-President (Research), Union Carbide & Carbon Corp.

Preparation and Properties of Iodide Chromium, by I. E. Campbell, Battelle Memorial Institute.

Electrowinning of Chromium from Trivalent Solutions, by M. C. Carosella and J. D. Mettler, Electro Metallurgical Co.

Melting Point of High-Purity Chromium, by LeRoy L. Wyman, National Bureau of Standards.

Mechanical Properties of Massive Chromium, by G. Asai and K. D. Deardorf, U. S. Bureau of Mines.

Effects of Impurities on the Ductility of Chromium, by W. H. Smith and A. U. Seybolt, General Electric Co.

Volume Change and Evolution of Gases on Heating Electrolytic Chromium, by Kenneth A. Moon and George A. Consolazio, Watertown Arsenal.

2:00 p.m.

HIGH-CHROMIUM ALLOYS

Chairman: P. R. Kosting, Metallurgist, Watertown Arsenal Laboratories.

Toughness and Mechanical Properties of Chromium-Iron Alloys, by H. Kato and E. T. Hayes, U. S. Bureau of Mines.

Creep Rupture Properties of Chromium-Nickel Alloys, by N. J. Grant, Massachusetts Institute of Technology.

A Forgeable Chromium-Iron Based Alloy, by D. P. Moon, H. A. Blank and A. M. Hall, Watertown Arsenal.

Metallography of Chromium and Chromium-Rich Alloys, by W. D. Forgeng and G. T. Motock, Union Carbide & Carbon Research Laboratories.

STEEL

Inhibition by Nitrogen of Graphitization in Steel, by G. V. Smith and B. W. Royle, Fundamental Research Laboratory, United States Steel Corp.

An Approach to the Study of the Effect of Rare-Earth Additions to Steel by Use of Radioactive Tracer Techniques, by C. S. DuMont, J. E. Gates, Battelle Memorial Institute, and C. N. Henderson, Mallinckrodt Chemical Works.

Optimum Boron Content for Hardenability, by J. C. Shyne, E. R. Morgan and D. N. Frey, Ford Motor Co.

On Banding in Steel, by C. Jatczak, D. J. Girardi and E. S. Rowland, Timken Roller Bearing Co.

INDUSTRIAL HEATING EQUIPMENT ASSOCIATION

(In Cooperation with ASM)

FURNACES, COMBUSTION EQUIPMENT AND INDUCTION HEATING

Vacuum Melting by Induction and Arc, by Frank Chesnut, Ajax Electrothermic Corp.

Batch-Type Strip Annealing Furnaces—Multiple and Single Stack, by Fred Olmstead, Lee Wilson Engineering Co.

Combustion Systems in Steel Mills, by Fred Bloom, Bloom Engineering Co.

EDUCATIONAL LECTURES ON EMBRITTLEMENT PHENOMENON

All Lectures by B. R. Queneau, U. S. Steel Corp.

4:00 p.m.

Summary of Embrittement Phenomena and General Discussion of Their Effects.

8:00 p.m.

Work Hardening and Precipitation Embrittlement.

Wednesday, Oct. 19

9:30 a.m.

A.S.M. ANNUAL MEETING

10:00 a.m.

CAMPBELL LECTURE

2:00 p.m.

STEEL

Some Effects of Metal Removal and Heat Treatment on the Surfaces of Hardened Steel, by Karl E. Beu, Goodyear Atomic Corp. and Donald P. Koistinen, Research Laboratories Division, General Motors Corp.

Effect of Temperature on Delayed Yielding of Mild Steel for Short Loading Duration, by Joseph M. Krafft, Mechanics Division, Naval Reserve Laboratory.

Effect of Tempering Temperature on Stress Corrosion Cracking and Hydrogen Embrittlement of Martensitic Stainless Steels, by Peter Lillys and A. E. Nehrenberg, Crucible Steel Co. of America.

Static Fatigue of High Strength Steel, by R. H. Raring and J. A. Rinebolt, Naval Research Lab.

MOLYBDENUM-VANADIUM-TANTALUM

Initiation of Discontinuous Yielding in Ductile Molybdenum, by J. A. Hendrickson, D. S. Wood. and D. S. Clark, California Institute of Technology.

Properties of Vanadium Consoliated by Extrusion, by C. E. Lacy and C. J. Beck, General Electric Co., Knolls Atomic Power Laboratory.

Mechanical Properties of Vanadium-Base Alloys, by W. Rostoker and A. S. Yamamoto, Armour Research Foundation of Illinois Institute of Technology, and R. E. Riley, Rem-Cru Titanium Corp.

Rolling Textures in Tantalum in Relation to BCC Metals, by J. W. Pugh and W. R. Hibbard, Jr., General Electric Co.

INDUSTRIAL HEATING EQUIPMENT ASSOCIATION

MECHANIZED HEAT TREATING EQUIPMENT AND ITS APPLICATION

Mechanized Molten Baths, by Leon Rosseau, Ajax Electric Co.

Mechanized Batch-Type Furnaces, by Martin Neumeyer, Sunbeam Corp.

Mechanized Continuous-Type Furnaces, by George McCormick, Industrial Heating Equipment Co.

Metallurgical Aspects Associated With Induction Heating, by Harry Osborn, Tocco Division, Ohio Crankshaft Co.

EDUCATIONAL LECTURES ON EMBRITTLEMENT PHENOMENON

All Lectures by B. R. Queneau, U. S. Steel Corp.

4:00 p.m.

Embrittlement by Gases.

8:00 p.m.

Temper Brittleness and Sigma Phase.

Thursday, Oct. 20

9:00 a.m.

STAINLESS STEELS

Influence of Alloying Elements on the Impact Transition Behavior of 1.2% Cr Steels Aged at 900°F., by E. J. Whittenberger and E. R. Rosenow, United States Steel Corp.

Creep Rupture Properties of Cold Worked Type-347 Stainless Steel, by N. J. Grant, A. G. Bucklin and Warren Rowland, Massachusetts Institute of Technology.

Notch Ductility of Type-410 (12% Cr) Stainless Steel, by F. A. Brandt, H. F. Bishop and W. S. Pellini, Metal Processing Branch Metallurgy Division, Naval Research Lab.

Influence of Strain Rate and Temperature on the Ductility of Austenitic Stainless Steel, by G. W. Form and W. M. Baldwin, Jr., Case Institute of Technology.

10:30 a.m.

POWDER METALLURGY IN ATOMIC ENERGY

(Jointly sponsored by the U. S. Atomic Energy Commission and A.S.M.

General Metallurgical Problems in the Design in Nuclear Power Reactors, by Vincent P. Calkins, Aircraft Nuclear Propulsion Project, General Electric Co.

Preparation of Metal Powders for Nuclear Reactor Purposes, by Premo

(continued on p. 18)

American Society for Metals

Tentative Technical Program
National Metal Congress and Exposition
Philadelphia—Oct. 15-21, 1955

Monday, Oct. 17

9:30 a.m.

TITANIUM

Rate of Diffusion of Carbon in Alpha and Beta Titanium, by F. C. Wagner, E. J. Bucur and M. S. Steinberg, Horizons, Inc.

Hydrogen Contamination in Descaling and Acid Pickling of Titanium, by G. A. Lenning, C. M. Craighead and R. I. Jaffee, Battelle Memorial Institute.

Mechanical Properties of Ti-Cr-Mo Alloys as Affected by Grain Size and Grain Shape, by H. R. Ogden, F. C. Holden and R. I. Jaffee, Battelle Memorial Institute.

Investigation of the Heat Treatability of the 6% Aluminum-4% Vanadium-Titanium-Base Alloy, by R. G. Sherman and H. D. Kessler, Titanium Metals Corp. of America.

MECHANICAL PROPERTIES

Notch Ductile High Strength Nodular Irons, by G. A. Sandoz, H. F. Bishop and W. S. Pellini, Metal Processing Branch Metallurgy Division, Naval Research Laboratory.

Fatigue and Anistropy in Copper, by M. L. Ebner and W. A. Backofen, Metals Processing Laboratory, Massachusetts Institute of Technology.

Influence of Vibration on the Solidification of an Aluminum Alloy, by R. S. Richards, Titanium Metals Corp. and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

10:30 a.m.

CONFERENCE ON DUCTILE CHROMIUM METAL AND ITS HIGH ALLOYS

(Jointly Sponsored by Office of Ordnance Research, U. S. Army, and ASM)

WORLD WIDE RESEARCH ON DUCTILE CHROMIUM

Chairman: J. W. Dawson, Director, Chemical Sciences Division, of Ordnance Research, U. S. Army.

Introductory Remarks, by P. N. Gillon, Colonel, Ordnance Department, U. S. Army.

Research on Chromium in America, by W. J. Kroll, Consultant.

Research on Chromium in Australia, by Henry L. Wain, Department of Supply, Government of Australia.

Research on Chromium in Europe, by A. H. Sully, Fulmer Research Institute, England.

2:00 p.m.

PHYSICAL METALLURGY OF HIGH-CHROMIUM ALLOYS

Chairman: J. H. Holloman, Manager, Metallurgy and Ceramics Research Department, General Electric Research Laboratory.

Influence of Chromium Metal Purity on the Properties of Chromium Alloys, by Robert I. Jaffee, Battelle Memorial Institute.

Solubility of Nitrogen and Oxygen in Solid Chromium, by A. A. Burr, Rennselaer Polytechnic Institute.

Ternary System of Chromimum-Nickel Alloy Containing up to 5% Nitrogen, by N. J. Grant, Massachusetts Institute of Technology.

Oxidation of Chromium and Chromium Alloys, by W. Martin Fassel, Jr., University of Utah.

Kinetics of the Formation of the Sigma Phase in Chromium-Iron Alloys, by Pol Duwez and Howard Martens, California Institute of Technology.

2:00 p.m.

TITANIUM-ZIRCONIUM

Nature and Decomposition Kinetics of Alpha Prime in Titanium-Vanadium Alloys, by F. R. Brotzen, Rice Institute, and E. L. Harmon and A. R. Troiano, Case Institute of Technology.

Metallography of Tempering of Alpha-Prime in Titanium Alloys, by R. F. Domagala and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Tensile Properties of Zirconium-Chromium Alloys—Particle Strengthening Effects, by J. H. Keeler, General Electric Co.

Progress in the Development of Creep-Resistant Zirconium Alloys, by Walston Chubb, Battelle Memorial Institute.

4:30 p.m.

CONFERENCE ON VACUUM MELTED METALS

8:00 p.m.

CONFERENCE ON VACUUM MELTED METALS

SEMINAR ON THEORY OF ALLOY PHASES

Saturday, Oct. 15

9:30 a.m.

Bonding Forces in Solids, by F. Seitz.

Band Theory of Bonding in Metals, by J. C. Slater.

Density of States as Determined by Soft X-Ray Spectroscopy, by C. H. Shaw.

2:00 p.m.

Intermediate Phases and Electronic Structure, by T. B. Massalski.

Crystal Structure and Atomic Size, by F. Laves.

Bonding Forces in Alkali Metals, by H. Brooks.

8:00 p.m.

Electronic Structure of Metals and Alloys, by L. Pauling.

Sunday, Oct. 16

9:30 a.m.

Intermediate Phases in Alloys of the Transition Elements, by P. Duwez.

Ferromagnetism, Antiferromagnetism and Crystal Structure, by C. Zener.

Atomic and Magnetic Ordering in Intermediate Phases, by J. S. Kasper.

2:00 p.m.

Atomic Moments of Transition Elements in Solid Solution Alloys, by C. Shull.

Solid Solutions and Ordering, by B. Averbach.

Alloy Phase Diagrams, by G. V. Raynor.

Tuesday, Oct. 18

9:30 a.m.

TEMPERING OF STEEL

Some Effects of Silicon on the Mechanical Properties of High Strength Steels, by C. H. Shih, A. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

Some Relationships Between Endurance Limit and Torsional Properties of Steel, by S. T. Ross, R. P. Sernka and W. E. Jominy, Chrysler Corp.

Influence of Molybdenum and Tungsten on Temper Embrittlement, by A. E. Powers, Materials & Processes Lab, General Electric Co.

Hardness of Tempered Martensite in Carbon and Low Alloy Steels, by R. A. Grange and R. W. Baughman, United States Steel Corp.

DEFORMATION

Deformation of Beryllium Single Crystals at 25 to 500°C., by H. T. Lee and R. M. Brick, School of Metallurgical Engineering, University of Pennsylvania.

Grain Boundary Creep in Aluminum Bicrystals, by F. N. Rhines, W. E. Bond and M. A. Kissel, Carnegie Institute of Technology.

Deformation and Fracture Mechanisms of Polycrystalline Magnesium at Low Temperatures, by F. E. Hauser, P. R. Landon and J. E. Dorn, University of California.

Influence of Cold Work on Strength of Steel at Elevated Temperatures, by Paul Shahinian, Metallurgy Division, Naval Research Laboratory.

CONFERENCE ON DUCTILE CHROMIUM METAL AND ITS HIGH ALLOYS

Chairman: A B. Kinzel, Vice-President (Research), Union Carbide & Carbon Corp.

Preparation and Properties of Iodide Chromium, by I. E. Campbell, Battelle Memorial Institute.

Electrowinning of Chromium from Trivalent Solutions, by M. C. Carosella and J. D. Mettler, Electro Metallurgical Co.

Melting Point of High-Purity Chromium, by LeRoy L. Wyman, National Bureau of Standards.

Mechanical Properties of Massive Chromium, by G. Asai and K. D. Deardorf, U. S. Bureau of Mines.

Effects of Impurities on the Ductility of Chromium, by W. H. Smith and A. U. Seybolt, General Electric Co.

Volume Change and Evolution of Gases on Heating Electrolytic Chromium, by Kenneth A. Moon and George A. Consolazio, Watertown Arsenal.

2:00 p.m.

HIGH-CHROMIUM ALLOYS

Chairman: P. R. Kosting, Metallurgist, Watertown Arsenal Laboratories.

Toughness and Mechanical Properties of Chromium-Iron Alloys, by H. Kato and E. T. Hayes, U. S. Bureau of Mines.

Creep Rupture Properties of Chromium-Nickel Alloys, by N. J. Grant, Massachusetts Institute of Technology.

A Forgeable Chromium-Iron Based Alloy, by D. P. Moon, H. A. Blank and A. M. Hall, Watertown Arsenal.

Metallography of Chromium and Chromium-Rich Alloys, by W. D. Forgeng and G. T. Motock, Union Carbide & Carbon Research Laboratories.

STEEL

Inhibition by Nitrogen of Graphitization in Steel, by G. V. Smith and B. W. Royle, Fundamental Research Laboratory, United States Steel Corp.

An Approach to the Study of the Effect of Rare-Earth Additions to Steel by Use of Radioactive Tracer Techniques, by C. S. DuMont, J. E. Gates, Battelle Memorial Institute, and C. N. Henderson, Mallinckrodt Chemical Works.

Optimum Boron Content for Hardenability, by J. C. Shyne, E. R. Morgan and D. N. Frey, Ford Motor Co.

On Banding in Steel, by C. Jatczak, D. J. Girardi and E. S. Rowland, Timken Roller Bearing Co.

INDUSTRIAL HEATING EQUIPMENT ASSOCIATION

(In Cooperation with ASM)

FURNACES, COMBUSTION EQUIPMENT AND INDUCTION HEATING

Vacuum Melting by Induction and Arc, by Frank Chesnut, Ajax Electrothermic Corp.

Batch-Type Strip Annealing Furnaces —Multiple and Single Stack, by Fred Olmstead, Lee Wilson Engineering Co.

Combustion Systems in Steel Mills, by Fred Bloom, Bloom Engineering Co.

EDUCATIONAL LECTURES ON EMBRITTLEMENT PHENOMENON

All Lectures by B. R. Queneau, U. S. Steel Corp.

4:00 p.m.

Summary of Embrittement Phenomena and General Discussion of Their Effects.

8:00 p.m.

Work Hardening and Precipitation Embrittlement.

Wednesday, Oct. 19

9:30 a.m.

A.S.M. ANNUAL MEETING

10:00 a.m.

CAMPBELL LECTURE

2:00 p.m.

STEEL

Some Effects of Metal Removal and Heat Treatment on the Surfaces of Hardened Steel, by Karl E. Beu, Goodyear Atomic Corp. and Donald P. Koistinen, Research Laboratories Division, General Motors Corp.

Effect of Temperature on Delayed Yielding of Mild Steel for Short Loading Duration, by Joseph M. Krafft, Mechanics Division, Naval Reserve Laboratory.

Effect of Tempering Temperature on Stress Corrosion Cracking and Hydrogen Embrittlement of Martensitic Stainless Steels, by Peter Lillys and A. E. Nehrenberg, Crucible Steel Co. of America.

Static Fatigue of High Strength Steel, by R. H. Raring and J. A. Rinebolt, Naval Research Lab.

MOLYBDENUM-VANADIUM-TANTALUM

Initiation of Discontinuous Yielding in Ductile Molybdenum, by J. A. Hendrickson, D. S. Wood. and D. S. Clark, California Institute of Technology.

Properties of Vanadium Consolidated by Extrusion, by C. E. Lacy and C. J. Beck, General Electric Co., Knolls Atomic Power Laboratory.

Mechanical Properties of Vanadium-Base Alloys, by W. Rostoker and A. S. Yamamoto, Armour Research Foundation of Illinois Institute of Technology, and R. E. Riley, Rem-Cru Titanium Corp.

Rolling Textures in Tantalum in Relation to BCC Metals, by J. W. Pugh and W. R. Hibbard, Jr., General Electric Co.

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MECHANIZED HEAT TREATING EQUIPMENT AND ITS APPLICATION

Mechanized Molten Baths, by Leon Rosseau, Ajax Electric Co.

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Metallurgical Aspects Associated With Induction Heating, by Harry Osborn, Tocco Division, Ohio Crankshaft Co.

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8:00 p.m.

Temper Brittleness and Sigma Phase.

Thursday, Oct. 20

9:00 a.m.

STAINLESS STEELS

Influence of Alloying Elements on the Impact Transition Behavior of 1.2% Cr Steels Aged at 900°F., by E. J. Whittenberger and E. R. Rosenow, United States Steel Corp.

Creep Rupture Properties of Cold Worked Type-347 Stainless Steel, by N. J. Grant, A. G. Bucklin and Warren Rowland, Massachusetts Institute of Technology.

Notch Ductility of Type-410 (12% Cr) Stainless Steel, by F. A. Brandt, H. F. Bishop and W. S. Pellini, Metal Processing Branch Metallurgy Division, Naval Research Lab.

Influence of Strain Rate and Temperature on the Ductility of Austenitic Stainless Steel, by G. W. Form and W. M. Baldwin, Jr., Case Institute of Technology.

10:30 a.m.

POWDER METALLURGY IN ATOMIC ENERGY

(Jointly sponsored by the U. S. Atomic Energy Commission and A.S.M.

General Metallurgical Problems in the Design in Nuclear Power Reactors, by Vincent P. Calkins, Aircraft Nuclear Propulsion Project, General Electric Co.

Preparation of Metal Powders for Nuclear Reactor Purposes, by Premo

(continued on p. 18)

To Speak at NYU–ASM Titanium Course

The Two Living "Grand Old Men" of Titanium, William J. Kroll (Left) and Matthew A. Hunter (Right), Are Pictured in Photographs Taken at the Time Each Did His First Successful Work on Titanium. Hunter produced the first reasonably pure (it was hot malleable) massive titanium in 1906. He recently retired as dean of faculty and head of the metallurgy department, Rensselaer Polytechnic Institute. Kroll developed and patented the first commercial titanium winning process, the magnesium reduction of titanium tetrachloride. The Kroll Process had its beginnings in Dr. Kroll's private research research laboratory in Luxembourg in the early 1930's. Titanium was a really tough nut to crack and it took two of the best men of the Twentieth Century to get it started. Dr. Kroll is the 1955 Recipient-Elect of the A.S.M. Sauveur Achievement Award

The present day status of titanium knowledge will be closely scrutinized at the NYU-ASM course next month. A number of authorities on the subject will lecture and act as discussion leaders to permit an exchange of production know-how and current thinking on this important and timely subject.

This one-week course, beginning Sept. 12, 1955, is being sponsored by the New York University College of Engineering and the Office of Special Services to Business and Industry in cooperation with A.S.M.'s new Metals Engineering Institute. Technical sessions will be held at NYU's University Heights campus in the Bronx.

Registration blanks and general information are available from Dean Wilbur McKee, New York University, 6 Washington Square North, New York 3, N. Y.

The technical program has been arranged as follows:

Monday, Sept. 12

Application and Melting

N. E. Promisel
M. E. Cieslicki
Dwight Kaufman
S. A. Herres
Ralph Edleman

Tuesday, Sept. 13

Physical Metallurgy

Harold Margolin
Elmars Ence
R. I. Jaffe

Wednesday, Sept. 14

Heat Treatment and Properties

William Rostoker
L. D. Jaffe
W. W. Wentz
H. D. Kessler
D. J. McPherson

Thursday, Sept. 15

Mechanical Metallurgy, Corrosion, and Fabrication

W. W. Wentz
Sam Tour
Lee Busch
John Kahles

Friday, Sept. 16

Fabrication and Extraction

Glenn Faulkner
August Bringewald
Arthur Schwope
P. Herasymenko
W. J. Kroll

Sessions will be held in the mornings, afternoons and evenings. Convenient on-campus dormitory rooms will be available for early registrants at $2.50 per day. Registration fees will be $90.00 per week or $30.00 per day.

Evidence of the interest expressed in this course on titanium are the five registrations already received from England.

A.S.M. TECHNICAL PROGRAM

(*Continued from p.* 17)

Chiotti and Harley A. Wilhelm, Institute for Atomic Research, Iowa State College.

Latest Developments in the Theory of Sintering, by Leslie L. Seigle, Fundamental Metallurgy Section, Sylvania Electric Products, Inc.

2:00 p.m.

STAINLESS STEELS

High-Nitrogen Austenitic Cr-Mn Steels, by V. F. Zackay, Scientific Laboratory, Ford Motor Co., J. L. Carlson, Hoskins Manufacturing Co., and P. L. Jackson, Misco Precision Casting Co.

Effect of Composition and Structure on the Creep Rupture Properties of 18-8 Stainless Steels, by F. C. Monkman, P. E. Price and N. J. Grant, Massachusetts Institute of Technology.

Austenitic Fe-Cr-C-N Stainless Steels, by G. F. Tisinai, J. K. Stanley and C. H. Samans, Standard Oil Co. of Indiana.

Effects of Chemical Composition and Heat Treatment Upon the Microstructure and Corrosion Resistance of AISI Types 309 and 310, by D. J. Carney and E. R. Rosenow, United States Steel Corp.

POWDER METALLURGY IN ATOMIC ENERGY

Powder Metallurgy of Beryllium and Zirconium, by Harold Hirsch, Knolls Atomic Power Laboratory, General Electric Co.

Alloy Formation by Powder Metallurgy, by Henry A. Saller and Frank A. Rough, Battelle Memorial Institute.

New Methods of Powder Metallurgy for Nuclear Reactor Purposes, by William D. Manly, Oak Ridge National Laboratory.

Safe Handling of Pyrophoric and Radioactive Materials, by L. R. Kelman, A. B. Shuck and R. C. Goertz, Argonne National Laboratory.

At New England Regional Meeting

Shown at the Annual Regional Meeting of the New England Chapters Held in Worcester Are, From Left: National President George A. Roberts; Joseph C. Danec, Past-Chairman of the Worcester Chapter, and General Chairman of the Convention and National Secretary William H. Eisenman

Nearly 400 members and guests of the Boston, Hartford, New Haven, Rhode Island, Springfield and Worcester Chapters gathered at the Hotel Bancroft in Worcester for the annual New England Regional Meeting. Activities of the meeting included visits to two of Worcester's largest industries, technical sessions and a banquet.

In the morning, delegates toured either Norton Co.'s new machine division or the Wyman-Gordon plant in North Grafton, site of the world's largest aircraft forging facilities.

Speaking on "Machining and Forming of Modern Materials" at the afternoon technical sessions, E. J. Tangerman, executive editor of *American Machinist,* told a standing-room crowd of over 200 that a punch card system used over 140 years ago to make cloth is now being employed to run milling machines automatically.

George W. Papen, production engineering manager for Lockheed Aircraft Corp., spoke on "Recent Developments in Aircraft Forgings". He pointed out that the large forging press program of the Air Force is dedicated to products lighter in weight but stronger than ever before.

Wives of the delegates visited famous Old Sturbridge Village, a living craft center accurately portraying New England's proud 150-year old history.

The program ended with the annual banquet in the main ballroom of the Bancroft Hotel and featured International Harvester Co.'s color-sound film, Man With a Thousand Hands, which illustrated the Kitimat power development project in British Columbia.

Joseph C. Danec, chairman of the Worcester Chapter, was general chairman for the meeting and National President George A. Roberts and National Secretary W. H. Eisenman were among the honored guests.

Rome Chapter Sets Up Career Guidance Program

The **Rome Chapter** is instituting a group of services to high-school students in the Mohawk Valley area which should be of interest to personnel in career guidance work. Members of the Bureau of Guidance of the New York State Education Department have expressed keen interest in and approval of this effort.

A.S.M. members, who are engaged in a broad field of professional work in the metal products industry, believe that the general public, and particularly high-school students, are not fully aware of the career possibilities in the profession of metallurgy. In line with the prime purpose of the A.S.M., to further the professional development of individuals, Rome Chapter is increasing its efforts to stimulate grass roots interest in metallurgical careers. The Chapter proposes to do this by seeing that the high-school student approaching graduation at least knows the work of the metallurgical profession and giving him an opportunity to visit a metallurgist in action in industry.

The Chapter has arranged to distribute career literature to secondary guidance persons, to send speakers to interested high-school groups, to conduct plant tours in metal products manufacturing industries, and to offer career counseling by practicing metallurgists.

Texas Chapter Honors Educational Lecturer

Past Chairman A. R. Oakley, of the Texas Chapter, Is Shown Presenting Charles F. Lewis (Right) a Check From the Chapter in Appreciation of His Efforts in Conducting the Annual A.S.M. Metallurgy Course. Charles has taught this course for the past 10 years, with an average annual attendance of about 100 students, and has done a great deal of work throughout the past years to promote the A.S.M. and metallurgy in the state of Texas. (Reported by Joe B. Marx for the Texas Chapter)

Powder Metal Seminar Meets in Austria

Shown at the Second International Seminar on Powder Metallurgy Held by Metallwerk Plansee in Reutte, Austria, Are, From Left: W. J. Kroll, Corvallis, Ore.; H. H. Hausner, Sylvania Electric Products Inc.; L. Himmell, Office of Naval Research, London; E. E. Thum, Metal Progress; *J. T. Norton,* M.I.T.; *Paul Schwarzkopf, Metallwerk Plansee and President, American Electro Metal Corp.; A. M. Schwartz, Wright Air Development Center; W. B. Crandall, Alfred University; Otto Graber, Director, Metallwerk Plansee; Gerald Starkey, U. S. Air Force Liaison Officer; Richard Kieffer, General Manager, Metallwerk Plansee; and Julius J. Harwood, Office of Naval Research. (Photograph courtesy of Metallwerk Plansee, Austria)*

Numerous Americans who attended the Joint Metallurgical Meetings in Europe extended their stay into the week of June 19 in order to be present at the second international seminar on powder metals at Reutte in the Austrian Tyrol. There they were part of the 400 men assembled from all the free countries to hear and discuss 38 papers on scientific and technical aspects of "Heat and Corrosion Resistant Sintered Materials". Most excellent arrangements for housing and entertainment were made by the Metallwerk Plansee, which sponsored the gathering. Founded in 1921 by Paul Schwarzkopf—known to many Americans as president of American Electro Metal Corp. in Yonkers, N. Y.—this firm has become a leader in Europe in the maufacture of hard carbide tools, porous bearings, metal filters and refractory metal parts for X-ray and electronic devices. Those who were fortunate enough to attend the meeting will long remember the hospitality and courtesies extended them.

A comment was made by one observer who attended the first conference three years ago that a complete shift of emphasis had occurred in the intervening time. Then, the contributions from Americans and English were mainly along theoretical lines, whereas the Europeans tended toward more practical aspects. This year the situation was reversed. Perhaps the outstanding paper was presented by Ivor Jenkins and E. R. Perry, of British General Electric Co., on the development and manufacture of "ventilated" gas turbine blades of a combination of 64% Co, 30% Cr, 6% W metallic powders, yet having physical characteristics equal to or better than the cast "vitallium" alloys of similar composition, and high - temperature fatigue and creep strength so much better that the gas temperatures can be raised about 270° C.

Another notable paper on this same problem was by D. F. Dickey and L. Havekotte of Firth Sterling, Inc., of Pittsburgh, who described the construction of a pilot plant for making turbine blades of titanium carbide with chromium binder and some of the manufacturing difficulties and their correctives. (Metallwerk Plansee had a similar wheel, perhaps 24 in. in diameter, driven by two oxyacetylene welding torches. The blades were white hot.)

Space prevents mention of the many other papers on almost every phase of powder metals and refractory metal compounds. The entire proceedings will be published by Metallwerk Plansee before the end of the year. It was resolved by those present that an international association should be formed of those interested in this vigorous branch of the metal and the refractory industries, and preliminary steps to this end were taken. Those interested in the seminar proceedings or in joining the international association should write to Dr. Richard Kieffer, General Manager, Metallwerk Plansee, Reutte, Austria. **E.E.T.**

Takes Over as Tri-City Chairman

Outgoing Chairman of the Tri-City Chapter, Victor H. Vieths, Jr., (Left) Is Shown Congratulating the New Chairman, Ralph W. Rogers (Right)

Compliments

To WILLIAM W. SIEG, president of Titan Metal Manufacturing Co., on being presented the Distinguished Alumnus Award of the Pennsylvania State University. Mr. Sieg, an A.S.M. member since 1923, had previously been honored with the David Ford McFarland Award for attainment in the metallurgical industry.

♦ ♦ ♦

To RALPH L. WILSON, director of metallurgy, Timken Roller Bearing Co., and past-president A.S.M., on his election as president of the Lehigh University Alumni Association.

♦ ♦ ♦

To HAROLD L. MAXWELL, E. I. du Pont de Nemours & Co., and past-president A.S.M., on receiving an honorary doctor of science degree from Cornell College, Mount Vernon, Iowa. Dr. Maxwell has been engaged in metallurgical and engineering materials development for du Pont since joining the company in 1930. He is currently special assistant to management, engineering service division.

♦ ♦ ♦

To SAMUEL L. HOYT, metallurgical consultant and formerly technical advisor, Battelle Memorial Institute, on being awarded an honorary Sc.D. degree by the South Dakota School of Mines and Technology, for his "preeminence in the field of technical education; his notable achievements in the solution of technical problems; his significant contributions to the development of metallurgical processes; and his unflagging interest in the promotion and stimulation of research".

♦ ♦ ♦

To FRANK A. FORWARD, head of the department of mining and metallurgy, University of British Columbia, on being awarded the Leonard Medal of the Engineering Institute of Canada for his paper "Ammonia Pressure Leach Process for Recovering Nickel, Copper and Cobalt From Sherritt Gordon Nickel Sulphite Concentrate".

♦ ♦ ♦

To CHRISTOPHER E. LOOS, assistant metallurgical engineer, structural and plate bureau, U. S. Steel Corp., on his receipt of the A.S.T.M. Award of Merit in recognition of significant leadership in improving specification requirements for structural steels.

♦ ♦ ♦

To WILLIAM G. FRICKE, JR., and M. SCOTT HUNTER, Aluminum Research Laboratories, Aluminum Co. of America, who received the Richard L. Templin Award of the A.S.T.M. for their paper on the "Metallographic Aspects of Fatigue Behavior".

♦ ♦ ♦

To AMERICAN METALLURGICAL PRODUCTS CO. which awarded a five-year membership in Pittsburgh Chapter to P. G. Shewman, Carnegie Institute of Technology, on a draw basis.

Power and Material Advances Explained

Present at a Meeting of the Puget Sound Chapter Were, Seated, From Left: C. R. Lundy, Chairman; N. L. Mochel, Westinghouse Electric Corp., Who Spoke on "Power and Materials, Now and in the Future"; and J. W. Sweet, A. S. T. M., Seattle. Standing, from left: Tom Williams, A. S. T. M.; W. L. Slosson, vice-chairman; R. J. Painter, executive secretary A. S. T. M.; and D. R. Meslang, secretary-treasurer of the Puget Sound Chapter A. S. M.

Speaker: Norman L. Mochel

Westinghouse Electric Corp.

Norman L. Mochel, president of the American Society for Testing Materials and manager, metallurgical engineering, Westinghouse Electric Corp., spoke on "Power and Materials, Now and in the Future" at a meeting of the **Puget Sound Chapter.**

By means of excellent graphs and charts, Mr. Mochel explained the relationship of power consumption versus the power-generating capacity of the United States now and in the future. He estimated that 10,000 kw. hr. per year of electricity will be required for each household within a relatively few years and pointed out that the only commodity in the United States that is going down in price as consumption increases is electricity. The reduced cost is due entirely to technological advances.

Mr. Mochel explained many of the advances over the past 50 years in steam turbine construction which resulted in increased compactness and production capacity per sq. ft. of floor space, besides being more pleasing to the eye. Steam turbine generators of 30,000 to 300,000 kw. are now being made which operate on pressures up to 5000 psi. and temperatures to 1200° F. He emphasized that continued improvement in high-temperature metals used in turbines is required to keep pace with the speedy advances being made technologically.

The coffee speaker, R. J. Painter, executive secretary, A.S.T.M., presented a short talk on "Cooperation in Materials, Research and Standards". He explained that while the A.S.T.M. is looked upon primarily as a standards organization, it plays a part in coordinating research and standardization among the various industries, trade groups, professional societies and governmental agencies. It is spearheading a drive to standardize nomenclature so that engineers in all fields will be able to easily understand one another. Committees have been set up to coordinate industry and government standards.—**Reported by L. F. Barber for Puget Sound Chapter.**

A.S.M. Member Travels to Dutch Indies to Teach

Mars G. Fontana, chairman of the department of metallurgical engineering, Ohio State University, spent the month of June in Aruba, Netherlands West Indies, teaching two courses in corrosion to the technical employees of the Lago Oil and Transport Co., which is owned by the Standard Oil Co. of New Jersey. Aruba is a small island in the Caribbean Sea, about 18 miles off the northern coast of Venezuela. Both the first course and the advanced course had approximately 40 persons enrolled.

Since corrosion takes a heavy toll in the area because of the high temperatures involved in refinery operations and because of sea water and the marine atmosphere, a great deal of interest was shown in the courses.

After leaving Aruba, Dr. Fontana went to the Dominican Republic, where he did some work on corrosion, then on to Haiti and Jamaica before returning to Columbus.

Describes Eskimo Habits and Customs

Shown at the Annual Meeting and Ladies Night Meeting of the Worcester Chapter Are, at Left, J. C. Danec, Chairman and Erwin C. Miller, Memorial Hospital, Who Gave an Illustrated Talk on a Trip He Took to Labrador. Dr. Miller is showing Mr. Danec one of a number of articles from his exhibit of Eskimo clothing and equipment. He is a director of the International Grenfel Association. (Photograph by C. Weston Russell)

Worcester Chapter combined a little business with pleasure as it observed its fourth annual Ladies' Night program in combination with its Annual Meeting.

Irwin C. Miller, physician-in-chief, Worcester Memorial Hospital, related the experiences of a trip he took to Labrador last winter to inspect the hospitals and nursing stations served in the northern regions by the International Grenfel Missions. Dr. Miller, who is a director of the International Grenfel Association, was accompanied by Anthony Paddon, medical officer for the association.

The trip took the party as far as Hebron, the most northern Eskimo settlement of the North Labrador coast, and required a little over one thrilling and harrowing month during one of the worst winters in years. Dr. Miller experienced just about everything that could happen to a man in the North Country, including frozen feet, being marooned in a howling blizzard for four days, an attack by hunger-driven half-starved Eskimo dogs and snow blindness. He and Dr. Paddon also found time to treat over 200 Indian, native and Eskimo patients.

Dr. Miller illustrated his remarks with some exceptionally good Kodachrome color slides and a silent film, also in color, in addition to a well-selected exhibit of Eskimo clothing and equipment. The pictures were taken under conditions of outside temperatures varying from —20 to —50°.

The biggest health problem among the inhabitants of Labrador is tuberculosis, Dr. Miller reported. High-blood pressure, insanity and other diseases common to high nervous tension are almost unheard of in this land where the average life span is only about 45 years.—**Reported by C. W. Russell for Worcester.**

Explains Patent Law at Meeting of Purdue Chapter

Speaker: C. W. Ooms

Patent Attorney

Casper W. Ooms, patent attorney, spoke on "Patent Law and Metallurgy" at a meeting held by the **Purdue Chapter.**

The history of patents and inventions from the early 15th century to the present was presented. The early metallurgical patents had to justify the principles of mining and use of metals. The inventor was required to show that extraction, ore dressing and metallurgical practices were not contrary to God's will. Opponents held that natural resources should not be adulterated. A method for the drainage of swamps and mines was the first recorded patent.

Basic scientific discovery of natural phenomenon cannot be patented. Patents are issued for methods, products, mechanical combinations (machines), and chemical formulas.

According to Mr. Ooms, most patents are written as sales talks in an effort to sell a product. He feels they should be presented as technical papers describing a technical process or product. The titles should be descriptive, for ease of identification, and not simply "a chemical formula" or "a chemical process".

Litigation between Company A and Company B concerning submerged arc welding was cited as an example of the application of the Doctrine of Equivalents.

Company A was protected by the original Rubinoff patent, which covered the general process, including consumable rod, mud and iron oxides. However, their commercial product contained steel foundry slag, which was described as "alkaline earth silicates". Company B's early product was found to be an infringement of the Rubinoff patent and a cease and desist injunction was placed against them by the courts.

Subsequently, Company B marketed a new flux which was principally manganese oxide. Company A held that the new product was in violation of the court injunction and attempted to get a declaration of contempt of court decision against Company B. Mr. Ooms, representing Company B, was required to prove that the MnO flux constituted a novel process. Company A's patent stated that the alkaline earth silicates material was inert and did not react during the welding operation. Mr. Ooms showed the U. S. Supreme Court that the Company B flux was not inert, thereby employing a novel process, and that the Doctrine of Equivalent should not apply.

Company B flux reacted violently when heated above red heat. It had high surface tension and resembled ice cubes when cooled. Company A flux simply softened and flowed when heated, wetted the metal and resembled " cracker jack" when cooled.

The Supreme Court ruled that Company B flux was not an equivalent of the Company A flux and, consequently, did not infringe on the existing patent.

It is interesting to note that Company A had used the MnO flux prior to the patent application; however, since is was not specifically mentioned in the patent, coverage was not granted.—**Reported by J. J. Phillips for Purdue.**

Resources Conferences

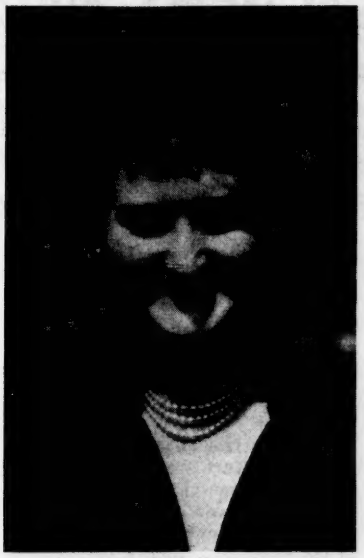
A recent schedule of the National Resources Conferences being sponsored by the Industrial College of the Armed Forces to be held in large industrial centers of the U. S., and covering such topics as "Strategic and Critical Materials", "Production", "Fuel and Power", and other subjects vitally concerned with our national economy, may be obtained by writing to: W. A. Baird, Colonel, U.S.A., Industrial College of the Armed Forces, Office of the Commandant, Washington, D. C.

Terminates 28 Years at A.S.M.

Twenty-eight years of service on the headquarters staff of the American Society for Metals was terminated on July 30 with the resignation of Miss Genevieve G. Fitzgerald. "Fitz", as she is known to a host of A.S.M. members and business associates, was married on that date to Dr. Joseph Schindly and now resides in Alliance, Ohio.

Fitz came to A.S.M. (then the American Society for Steel Treating) in 1927, fresh from business college, on a two-week summer vacation job of typing form letters. But the two weeks stretched on and on and her duties were expanded to include almost the entire range of office activities, even including a seven-month tour as substitute bookkeeper. Eventually she was settled into the position of secretary to J. Edward Donnellan, then secretary of the Recommended Practice Committee, and editor of the first editions of Metals Handbook. Seven years later she was made secretary to Ray T. Bayless, assistant secretary of the Society and editor of *Transactions*. Here she learned the business of getting out the Society's technical papers from the ground up, and took over so much of the editorial detail that two years ago she was named associate editor of the *Transactions*.

Fitz is known to a wide circle of A.S.M. members, not only by her association with the headquarters staff but because of her many years



"Fitz"

of assisting Mr. Bayless with the efficient operation of A.S.M. technical sessions, year by year, at the Metal Congress. She is known as an energetic, cheerful, generous person—always ready with a quip or a laugh. She will be deeply missed, and her associates would surely protest any change which had less promise for her future happiness than her marriage to genial Dr. Joe.

Fatigue Failure in Large Parts Subject at Montreal

Speaker: Thomas A. Keiser
Timken Roller Bearing Co.

At a meeting of the **Montreal Chapter**, Thomas A. Keiser, materials testing engineer, Timken Roller Bearing Co., gave a talk on "Fatigue Failures in Large Parts".

Mr. Keiser suggested that 90% of all fractures may be attributed to poor design or manufacturing processes. A rule of thumb is often followed in which small design changes are made progressively until the first failure occurs. It would be better, Mr. Keiser stated, to study such changes with the fullest possible knowledge of the stresses and strains, especially residual stresses, involved in the performance of the part. If sufficient study is made, the rule of thumb method would not be necessary.

Mr. Keiser pointed out errors which may occur in laboratory work where the sample used for fatigue testing is not representative of the production part as regards size. For this reason, it is always preferable to test a full-size sample, if possible. Mr. Keiser showed slides of S-N curves which compared the difference in results of fatigue tests on railroad axles with those obtained on small test pieces cut from the axles. **—Reported by Rafe Sherwin for Montreal Chapter.**

Northeast Pennsylvania Elects New Officers

Officers of the Northeast Pennsylvania Chapter, Which Is Entering Its Second Year, Include, From Left: A. J. Babecki, Publicity Chairman; H. L. MacGregor, Executive Committee; R. B. Little, Reception Chairman; W. Pollack, Secretary-Treasurer; J. J. Penkoske, Chairman; F. C. Brautigam, Vice-Chairman; and R. C. Williams, Public Relations Chairman. (Report by A. J. Babecki for Northeast Pennsylvania)

Metallurgical News and Developments

Devoted to News in the Metals Field of Special Interest to Students and Others

A Department of *Metals Review*, published by the
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

Cermets—A rapid, economical process for applying a common type of cermet coating to a metal base is being used by National Bureau of Standards. The cermet powder is a chromium-boron-nickel mixture combined with a ceramic frit. The process employs ordinary ceramic coating procedures to replace the flame-spraying method, and provides a hard, high-temperature resistant facing for metal parts.

Wall Chart — A wall chart giving weight and bend data on aluminum sheet in standard alloys has been prepared by Kaiser Aluminum & Chemical Sales, Inc. The chart is divided into three tables which provide data on weight per sq. ft., weight per sheet in standard sizes and approximate radii for 90° cold bends of aluminum sheet in various gages, alloys and tempers. Write Kaiser, Industrial Service Div., 1924 Broadway, Oakland 12, Cal.

Reynolds Buys—Reynolds Corp., Reynolds Metals Co. affiliate, has purchased 88% of outstanding preferred and common stocks of Southern States Iron Roofing Co. of Savannah, Ga., manufacturer and distributor of building materials.

Electrode — The Easyarc LH 7-16 electrode, just announced by Air Reduction Sales Co., deposits over 60% more metal than conventional low-hydrogen electrodes, by actual test. Factors which make this possible include concentrated arc energy, powdered iron coating melts and becomes part of the weld and extra-heavy coating helps control arc action and allows higher currents to be used with complete safety.

Welding Equipment—Complete automatic, consumable-electrode welding equipment adapted for use with low-cost carbon dioxide shielding gas has been produced by General Electric Co.'s welding department.

Heating Unit — A 3 kw. high-frequency induction heating unit is being offered by Lindberg Engineering Co. for brazing, soldering, hardening and other light heat treating applications. It can be used to quickly melt small quantities of ferrous and nonferrous metals for spectroscopic analysis, etc., in research laboratories.

Refractories — Richard C. Remmey Son Co. has announced a new line of crystallite refractories for high-temperature applications in glass furnaces, nonferrous foundries, primary steel production, ceramic kilns and furniture, and power plants. Preliminary installations show improvements in operating life as high as 250% over competing brands.

Alloy Cast Iron—Patents have been granted to Karl Spitz, vice-president, Uniworld Research Corp. of America, to cover a large group of new cast iron alloys, known as Rezistan irons, in the chromium, nickel, copper, molybdenum and aluminum combination, with greatly improved properties.

Make Purchase—Wickwire & Co. has purchased the Lindberg Air and Hydraulic Cylinder Division of Lindberg Engineering Co. Purchase covers entire stock, machinery, designs and development work.

Corrosion Protection — Good resistance to corrosion and flaking of painted metal can be secured by use of concentrated chromic and phosphoric acid rinses before painting, according to report by the Office of Technical Service, U. S. Department of Commerce.

Toolsteel Samples — Spectrographic standard samples of high speed toolsteels are available from National Bureau of Standards. Six toolsteel standards, analyzed and certified as to composition, have been added to over 500 samples which the Bureau distributes to analytical and research laboratories for use in controlling chemical processes and maintaining accuracy of equipment. Standards include complex alloys of iron, chromium, vanadium, molybdenum, tungsten and cobalt, and small amounts of other elements.

Abrasive Wheel — A new type of wearable coated abrasive contour wheel which permits polishing of complex contours with an efficiency never attained before has been announced by Behr-Manning Division of the Norton Co. The Kon-Toor wheel is substantially an all-coated abrasive wheel, capable of being shaped to the work and of holding that shape as it wears.

Establish Award—A lifetime devoted to technical and scientific leadership in the steel castings industry has been recognized and honored by the directors of the Steel Founders' Society through the establishment of the Gustaf A. Lillieqvist Steel Foundry Facts Award. The award will be made annually for the best paper published the preceding year.

Corrosion Course—A short course on Corrosion will be given at the University College and School of Engineering, Washington University, St. Louis, from Sept. 12 through Sept. 16. The course is presented with the cooperation of the Greater St. Louis Section, N.A.C.E.

Controller — An automatic controlling, recording and proportioning instrument which enables the heat treater to set his atmosphere generator or furnace in equilibrium with any steel to be heat treated has been developed by Lindberg Engineering Co. It is called the Carbotrol.

Cold Worked Tubing—The Tube Reducing Corp. has announced plans to expand facilities for the manufacture of a special type cold finished tubing, to be called Rockdrawn tubing, which is produced by a unique combination of processes to obtain improved surface, closer tolerances and better mechanical properties.

Cleaning Compound—Metal parts can be efficiently cold cleaned before inspection, storing or further processing through the use of a specially formulated cleanser produced by the International Chemical Co., Inc.

Solar Conference—An international conference on the scientific basis of applied solar energy will be held at University of Arizona from Oct. 31 through Nov. 1 as a prelude to the World Symposium on Applied Solar Energy in Phoenix Nov. 2-4.

Measuring Magnifier—A seven-power industrial measuring magnifier for use in metalworking and other precision industries has been announced by Bausch & Lomb Optical Co. It will measure radii, line thickness, angles and metric distance, lineal and other dimensions.

New Headquarters—Metal & Thermit Corp. has established sales headquarters and warehousing space for products of all divisions for the Pacific Coast Region in the Los Angeles area.

A.S.M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared by the Technical Information Division of Battelle Memorial Institute, Columbus, Ohio

A
General Metallurgical

75-A. Electrolytic Treatment of Waste Sulfate Pickle Liquor Using Anion Exchange Membranes. C. Horner, A. G. Winger, G. W. Bodamer and R. Kunn. *Industrial and Engineering Chemistry,* v. 47, June 1955, p. 1121-1129.

New process, using Amberplex membrane, permits recovery of electrolytic iron and the regeneration of sulfuric acid, thus eliminating the disposal problems. Graphs, diagrams. (A8)

76-A. Applications of Small Industrial Ovens. Herman Gehnrich. *Industrial Heating,* v. 22, May 1955, p. 1019 + 7 pages.

Applications and discussion of batch-type ovens. Photographs. (A general)

77-A. Unwieldy Metal Sheets Handled Neatly by Automatic Machines. *Iron Age,* v. 175, June 16, 1955, p. 96-97.

Use of feeders, turnover machines, pilers and other equipment for handling large sheets. Photographs. (A5)

78-A. Non-Ferrous Progress Since World War I. Maurice Cook. *Metallurgia,* v. 51, no. 307, May 1955, p. 227-230.

Progress in melting and casting, rolling, tube production, extrusion, furnace design, joining, and the advent of new materials and their uses. (A general, Cu, Al, Ti)

79-A. Compressed Air in Aircraft Production. W. E. Wright. *Metalworking Production,* v. 99, Apr. 22, 1955, p. 705-713.

Use of compressed air for production and testing. Photographs, diagrams. (A5)

80-A. (German.) **The Upward Tendency of World's Steel Industry.** Fritz Grotius. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 613-618.

Evolution of the young steel producing countries. Melting furnaces. The bottleneck of scrap supply. Tables. (A4, D general, ST)

81-A. (German.) **Analysis of Conversion and Processing Cost in Steel-Works as a Guide to Technical Rationalisation.** Kurt E. Poppe. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 633-640.

Percentage alterations of the initial iron quantity through successive processing stages as related to corresponding expenditures and returns, as well as to conversion and materials cost in each stage, subdivided into groups of cost types. Graphs, diagrams. (A4)

82-A. Materials Handling—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2F-14F.

Developments in equipment; future prospects for improved mechanized systems. Photographs. (A5)

83-A. Price and Production Data—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 1M + 26 pages.

Statistics on ferro-alloys, nonferrous alloys, pig iron, steel and scrap metals. Photographs, tables, graphs. (A4)

84-A. Mechanics of Tool Engineering. I. Fundamentals of Plant Layout. Andrew E. Rylander. *Western Machinery and Steel World,* v. 46, June 1955, p. 85-90.

Disposition of manufacturing equipment—or logistics—to show how machines and facilities must be properly located to provide the straight-line flow and efficient handling needed for manufacturing economy. Diagrams. (A5)

B
Raw Materials and Ore Preparation

113-B. Effect of Atmosphere on Refractories. Hobart M. Kraner. *American Ceramic Society Bulletin,* v. 34, June 1955, p. 173-176.

Factors of furnace operation which affect life of refractories, including dusts and their absorption by the refractory, vapor pressure of certain materials normal to metallurgical processes, variation of percentages of gaseous components, and effect of temperature alone on the constitution of important constituents of the refractory. Tables, graphs, diagram, photograph. 4 ref. (B19)

114-B. Removal of Sulphur During Iron-Ore Sintering. I. Laboratory Studies of the Kinetics of Sulphide and Sulphate Decomposition. V. Giedroyc. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 129-139.

Studies mechanism by which pyritic and sulphate sulphur is eliminated during sintering iron ores and factors affecting rate of sulphur removal using synthetic sinter mixes. Graphs, tables. 23 ref. (B16, Fe)

115-B. The Role of Iron-Ore Beneficiation. The Solution of the Taconite Problem in the U.S.A. William A. Haven. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 144-154 + 2 plates.

The increasingly important role of iron ore beneficiation in the manufacture of pig iron and the development of new agglomerating processes that have helped to solve the taconite problem. Tables, diagrams, photographs, graph. 6 ref. (B14, Fe)

116-B. Salt Lake Tungsten Company's Custom Plant Treats Low Grade Concentrates to Produce Synthetic Scheelite. Blair T. Burwell. *Mining World,* v. 17, June 1955, p. 44-49.

Objectional impurities; low-grade deposits; evolution of process; Salt Lake process; digest in pressure reactors; controls required; filtration; solution impurities; precipitation. Photographs, flowsheet. (B14, W)

117-B. Measuring the Crushing Resistance of Rocks and Ores. Benjamin B. Burbank. *Pit and Quarry,* v. 47, June 1955, p. 102-106.

A practical method of rapidly obtaining the compressive strength, elastic properties and approximate energy requirements for crushing rocks and ores. Graphs, photographs. (B13)

118-B. (German.) **The Problem of the Economy of Iron and Steel Production From Low-Grade Raw Materials.** Reinhold Baake. *Metallurgie,* v. 5, no. 3, Mar. 1955, p. 77-82.

Factors to be considered in the economical smelting of low-grade iron ores. Tables. 4 ref. (B16, D1, Fe)

119-B. (German.) **The Metallurgical Evaluation of Iron Ores and Other Raw Materials.** A. N. Pochwisnew. *Metallurgie,* v. 5, no. 3, Mar. 1955, p. 82-85.

Mathematical determination of coke consumption and heat equivalence based on chemical composition of different iron ores. (B18, B22, Fe)

120-B. (Hungarian.) **Pelletizing of Coarse Iron-Ore Fines and Slurries.** Laszlo Visnyovszky and Tiborné Hollo. *Kohaszati Lapok,* v. 10, no. 5, May 1955. p. 201-210.

Process for utilizing the by-products of aluminum production. Laboratory experiments, pilot-plant process. Photographs, graphs, tables. 18 ref. (B16, Fe)

121-B. (Hungarian.) **Geochemistry of the Vanadium Content of Bauxite.** Tihamér Gedeon. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 229-231.

Effect of various manufacturing processes on the appearance of va-

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

nadium salt. Increasing the vanadium production and its elimination from the alumina production. 9 ref. (B general, V)

122-B. (Russian.) **Mechanism of the Interaction of Xanthates With the Surface of Sulfide Minerals.** I. N. Plaksin, S. V. Bessonov and V. I. Tiurnikova. *Doklady Akademii Nauk SSSR*, v. 102, no. 2, May 11, 1955, p. 331-333.

Effect of oxygen on the flotation of chalcopyrite (with quartz) in an argon medium, with varying amounts of tagged ethyl potassium xanthate being introduced. Graphs. 2 ref. (B14)

123-B. Pelletizing of Iron Ore Concentrates. I. T. L. Joseph. *Blast Furnace and Steel Plant*, v. 43, June 1955, p. 641-646.

Reserves of iron ores, development of the pelletizing process and properties of pellets. Diagram, photograph, tables, graph. 14 ref. (To be continued.) (B16, B10, Fe)

124-B. Refractories—1855 to 1955. *Iron Age (100th Anniversary Issue)*, v. 175, June 1955, p. 2J-8J.

New materials and applications in linings of furnaces and other equipment. Photographs (B19)

125-B. Use of Autoclaves and Flash Heat Exchangers at Beaverlodge. R. W. Mancantelli and J. R. Woodward. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, June 1955, p. 751-755.

Method of concentrating the material by dissolving the uranium in sodium carbonate, separating liquids from solids, and precipitating uranium from solution by sodium hydroxide. Photograph, diagrams. 4 ref. (B14, U)

126-B. Experimental Planning for Rapid Determination of Optimum Process Conditions. W. A. Griffith. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, July 1955, p. 834-838.

Fractional replication of factorial design, method for planning experimentation and for analysis of data obtained, as applied to a flotation investigation. Tables. 7 ref. (B14)

127-B. Progress in Mineral Dressing. F. B. Michell. *Mining Journal (Annual Review)*, 1955, May, p. 111 + 7 pages.

Developments in crushing, classifying, and separating equipment. Photographs, diagram. 26 ref. (B13, B14)

128-B. (German.) **Synthetic Cryolite in the Aluminum Industry.** Günther Wendt. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 8, no. 5, May 1955, p. 207-214.

Uses of cryolite in the ceramics, pesticides and aluminum industry; losses of cryolite in aluminum electrolysis; demand and supply of natural Na_3AlF_6; synthesis of Na_3AlF_6, its behavior in electrolysis, quality testing and recovery from smelting wastes. Tables, graphs. 27 ref. (B22, Al)

C

Nonferrous Extraction and Refining

93-C. Zone-Melting. William G. Pfann and Karl M. Olson. *Bell Laboratories Record*, v. 33, June 1955, p. 201-205.

Process being used extensively in commercial production of ultra-pure germanium. Method is being applied on a laboratory scale to a host of other materials. Photographs, diagrams, graph. (C5, Ge)

94-C. Aluminum and Its Ores. V. A. Eyles. *Discovery*, v. 16, June 1955, p. 251-255.

Popular history of aluminum production and details of cryolite and bauxite geology. Table, diagrams, photographs. (C23, B10, Al)

95-C. Recent Innovations in the Control and Operation of Zirconium Reduction Furnaces. F. E. Block and A. D. Abraham. *Electrochemical Society, Journal*, v. 102, June 1955, p. 311-315.

Recent trends in automatic furnace control and instrumentation. Diagrams, table. 8 ref. (C21, Zr)

96-C. Preparation of Titanium by Fluoride Electrolysis. M. A. Steinberg, G. S. Carlton, M. E. Sibert and E. Wainer. *Electrochemical Society, Journal*, v. 102, June 1955, p. 332-340.

Preparation of commercially pure metal powder by electrolysis of K_2TiF_6 in molten sodium chloride. Operating conditions of the electrolysis and their effect upon the metal so produced. Photographs, graphs, micrographs, tables, diagrams. 12 ref. (C23, Ti)

97-C. Melting Furnaces for Non-Ferrous Metals. III. W. A. Darrah. *Industrial Heating*, v. 22, May 1955, p. 966, 968, 970, 972.

Refractories, burners and furnace melting, installation problems. (C21)

98-C. Vapour Phase Production of Titanium. C. J. V. Denning. *Metal Industry*, v. 86, May 13, 1955, p. 395-398.

Experimental work carried out on invention which may be basis of a continuous reduction process. Tables, diagram, photographs. 2 ref. (C4, Ti)

99-C. New Developments in Titanium Extraction. J. P. Levy. *Metal Industry*, v. 86, May 20, 1955, p. 415-418.

Features of vapor phase reduction of titanium tetrachloride by magnesium that makes it a possible successor to the established liquid phase process. Photograph, diagrams. 4 ref. (C4, Ti)

100-C. (Hungarian.) **Rapid Determination of the Sodium Content of Cryolite and the Cryolite Bath.** Györgyné Posgay. *Kohaszati Lapok*, v. 10, no. 5, May 1955, p. 231-232.

Electrodialytic method applied after elimination of fluorine. Table. 8 ref. (C23)

101-C. Install Vacuum Setup for Dual Melting Role. W. G. Patton. *Iron Age*, v. 175, June 23, 1955, p. 95-97.

Semi-continuous 100-lb. vacuum induction melting furnace. Close control of oxygen and nitrogen content and ability to make alloy additions under vacuum conditions will aid the development of new high-temperature alloys. Diagram, photographs. (C25, SG-h)

102-C. Oxygen Flash Smelting Swings Into Commercial Operation. *Journal of Metals*, v. 7, June 1955, p. 742-750.

Copper flotation concentrate and flux are injected horizontally with oxygen into a specially designed reverberatory furnace, and smelting temperature is maintained solely by the flash combustion of iron and sulphur while the particles are in suspension. Photographs, diagrams, tables, graphs. 17 ref. (C21, Cu)

103-C. Thirty-One Year Old Furnace Bottom Yields Copper Bonanza. Harold Foard. *Journal of Metals*, v. 7, July 1955, p. 793-795.

History of the furnace, removal of the slag bottom, analysis of the slag, installation of the new bottom. Tables, diagrams. (C21, Cu)

104-C. Carbon Bonded Silicon Carbide Crucibles Offer Outstanding Advantages. G. J. Easter. *Journal of Metals*, v. 7, July 1955, p. 805-810.

Crucibles can be put directly into a hot furnace without pre-annealing or preheating, a charge of cold metal can also be charged into the hot crucible and full heat applied without hesitation. Other advantages. Photographs, tables. (C21, E10, Al, Cu)

105-C. Processing of Zinc Oxide Fume at Flin Flon, Manitoba. Roy Ellerman. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, July 1955, p. 813-822.

Includes roasting for fluorine elimination and counter-current leaching to produce a neutral sulphate solution. This solution is combined with zinc sulphide leach solution for subsequent purification and electrolysis. Photograph, diagrams, graphs, tables, flowsheets. 2 ref. (C23, B14, Zn)

106-C. Preparation of Pure Titanium. *Light Metals*, v. 18, June 1955, p. 175-176.

Application of a process known as "catalytic distillation" to the extraction and purification of titanium and aluminum. (C22, Ti, Al)

107-C. Progress in the Extraction of Aluminum. L. V. Chilton. *Metal Industry*, v. 86, June 3, 1955, p. 457-459.

Reduction processes, furnace design and operation, purity of product, power supply, plant locations. Photographs, diagrams. 11 ref. (C general, Al)

108-C. Extraction Metallurgy. Graham Oldham. *Mining Journal (Annual Review)*, May, p. 127, 129, 131, 133.

Developments in nonferrous reduction processes and refining techniques. Photographs. 26 ref. (C general)

109-C. On Some Problems of High-Vacuum Metallurgy. W. Scheibe. *Henry Brutcher Translation No.* 3488, 6 p. (Abridged from *Metall*, v. 7, nos. 19-20, 1953, p. 751-754.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 171-C, 1953. (C25, J23, H15, Al, Cu, Fe, Ti, Ag, Pt)

110-C. (Italian.) **Efficiency of Induction Furnaces for the Melting of Pig Iron and Steel, Copper Alloys, and Aluminum and Its Alloys.** G. Aldo Tagliaferri. *Fonderia*, v. 4, no. 4, Apr. 1955, p. 155-161.

Compares various types of induction furnaces; effects of low and high frequencies and crucible-type; energy equations. Photographs, diagrams, tables. (C21, D6, CI, ST, Cu, Al)

111-C. (Polish.) **Refining of Metallurgical Lead.** Kazimierz Doniec. *Wiadomosci Hutnicze*, v. 11, no. 2, Feb. 1955, p. 51-56.

Chemical compositions of leads prepared in foundries at home and abroad. Removal of copper, detinning, dezincing, elimination of arsenic and antimony. Tables, diagrams. (C21, Pb)

112-C. (Polish.) **Fire Refining of Copper.** Kazimierz Kurski. *Wiadomosci Hutnicze*, v. 11, no. 3, Mar. 1955, p. 72-78.

Types of copper ores appropriate for fire refining and impurities contained; behavior of impurities during refining. Graphs. 5 ref. (C21, Cu)

113-C. (Polish.) **Eliminating the Noble Metals.** Kazimierz Doniec. *Wiadomosci Hutnicze*, v. 11, no. 3, Mar. 1955, p. 84-88.

Methods of refining lead to eliminate small amounts of silver, gold and zinc by electrolytic refining, liquation and distillation. Resulting chemical compositions of refined leads. Table, diagrams, graphs. (C23, C22, C28, Pb)

D

Ferrous Reduction and Refining

224-D. Blast-Furnace Design and Refractory Wear. *Foundry Trade Journal*, v. 98, May 19, 1955, p. 545-547.

German experience with carbon-block linings which points a number of parallel applications to foundry furnaces. (D1, E10)

225-D. Air Flow in Beds of Granular Solids. J. B. Wagstaff and E. A. Nirmaier. *Industrial and Engineering Chemistry*, v. 47, June 1955, p. 1129-1135.

Five earlier works compared in the first step of studying gas flow and its reactions in a blast furnace. Tables, graphs. 14 ref. (D1)

226-D. Hydrogen in Steelmaking. III. H. Epstein, J. H. Walsh and T. B. King. *Industrial Heating*, v. 22, May 1955, p. 990, 992.

Rate of hydrogen elimination from the bath by a flushing calculation. Graph. 6 ref. (D2, ST)

227-D. Large Electric Furnaces. D. F. Campbell. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 107-113 + 2 plates.

Past, present and future status of the large arc furnace as a producer of carbon and low alloy steel in large quantities. Table, photographs, diagram. 1 ref. (D5, CN, AY)

228-D. The Operation of a 60-Ton Arc Furnace. R. Wilcock. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 113-116 + 1 plate.

Description of operating experience during the first few months of production covering melting, slag reduction and oxidation, temperature controls, electrode consumption, refractory performance and quality of steel produced. Photographs, tables. (D5, AY)

229-D. Observations of Stainless Steel Melting Practice. D. C. Hilty, H. P. Rassbach and Walter Crafts. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 116-128.

Melting practice for stainless steels reviewed and rationalized with theoretical considerations to provide bases for prediction and control of the process and the design of the most economical practices. Graphs, tables. 23 ref. (D general, SS)

230-D. Rate of Desulphurization of Carbon-Saturated Iron by Blast-Furnace Slags. C. E. A. Shanahan. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 140-144.

Laboratory experiments show that large degrees of agitation do not produce equivalent increases in rate of desulphurization of liquid iron by blast furnace slags. Graph. 8 ref. (D1, Fe)

231-D. The Design and Construction of Lackenby Steelworks. I. Layout, General Design, and Construction. II. Furnaces, Mixers, and Fuel-Supply Systems. A. P. Clark and S. Cornforth. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 180-188 + 4 plates.

Plant designed for annual output of 625,000 tons of ingots from five 360-ton openhearth tilting furnaces, and two 600-ton active mixers, working 50 to 80% hot metal and producing mainly structural steels. Diagrams, photographs. (D2, A5, ST)

232-D. (German.) **What Reactions Cause the Foaming of Slag in the Basic Open-Hearth Process?** Kurt Fellcht. *Metallurgie*, v. 5, no. 3, Mar. 1955, p. 85-98.

Theoretical analysis and experimental study. Graphs, diagrams, tables, photographs, micrographs. (D2)

233-D. (German.) **Investigations on the Reducing Conditions in the Blast Furnace.** Jakob Willems, Willy Oelsen and Hans Genz. *Stahl und Eisen*, v. 75, no. 10, May 19, 1955, p. 618-624.

Comparison of reducing conditions when smelting two burdens in the same furnace and smelting of one burden in two different furnaces. Graphs, diagrams. 11 ref. (D1)

234-D. (German.) **Tasks and Problems of Pig-Iron Production in Switzerland.** Hans Georg Erne. *von Roll Mitteilungen*, v. 13, nos. 1-2, Jan.-June 1954, p. 1-12.

Properties of electric pig iron. Graphs, map, diagram, table, micrographs. 15 ref. (D8)

235-D. (German.) **The Low-Shaft Oxygen Furnace.** Hans Georg Erne. *von Roll Mitteilungen*, v. 13, nos. 1-2, Jan.-June 1954, p. 13-23.

Pig iron can be melted from ore or steel scrap and gray cast iron from steel or cast iron scrap. Diagrams, tables, graphs. 7 ref. (D1, CI)

236-D. (Hungarian.) **Decreasing the Burning Losses of Deoxidizing Materials, and Endogenous Slag in Steel During Open-Hearth Steel Production. I.** Dezso Csépai. *Kohaszati Lapok*, v. 10, no. 5, May 1955, p. 211-214.

Investigation of the physical chemistry of the oxidation of Mn in the openhearth furnace. Experiments for optimum transition of the manganese of the charge into the steel. Graphs, tables. (To be continued.) (D2, ST)

237-D. (Polish.) **Device for Measuring the Dynamic Pressure in Blast Furnace Tuyeres.** A. Maslanka. *Hutnik*, v. 22, no. 3, Mar. 1955, *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa*, v. 6, no. 3, 1955, p. 10-12.

Design, operation, measurement of temperature and blast flow. Diagrams, table. (D1)

238-D. (Russian.) **Mechanism of the Dephosphorizing Process of Liquid Iron by Slag.** O. A. Esin and V. N. Shikhov. *Doklady Akademii Nauk SSSR*, v. 102, no. 2, May 11, 1955, p. 327-330.

Influence of the original content of phosphorus; determination of the reaction order for the passage of phosphorus from the metal into the slag and the reverse process; temperature and time factors; investigation by tracer elements. Graphs, diagram. 6 ref. (D general, Fe)

239-D. (Russian.) **Investigation of the Limiting Stages of the Process of Desulfurizing Liquid Iron by Means of Slag.** O. A. Esin and V. N. Shikhov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 2, Feb., p. 105-112.

Effect of original concentration of the sulfur in the metal on the rate of its passage into various slags. Tables, graphs, 12 ref. (D general, Fe)

240-D. Production Control of Quality Steels. R. W. Graham. *Blast Furnace and Steel Plant*, v. 43, June, 1955, p. 619-626.

Consideration of the present day steelmaking problem from the viewpoint of an operator who is responsible not only for quality, but also for plant economics. Photographs, graphs. (D general, A4, ST)

241-D. Coke Quality and Blast Furnace Operating Practice. W. T. Rogers. *Blast Furnace and Steel Plant*, v. 43, June 1955, p. 627-634.

By the use of simultaneous analysis of blast furnace operating variables and coke quality characteristics, the independent effect of coke quality on blast furnace performance can be evaluated in an uncomplicated manner. Tables, graphs. 1 ref. (D1)

242-D. Pneumatic Steelmaking Processes. I. D. J. Carney. *Blast Furnace and Steel Plant* v. 43, June 1955, p. 635-640.

Some of the processes, advantages and disadvantages, properties and uses, chemistry, thermal requirements, deoxidation reactions, nitrogen control. Graphs, tables. (To be continued.) (D8, ST)

243-D. Some Chemical Engineering Problems of the Iron and Steel Industry. A. H. Leckie. *Chemical and Process Engineering*, v. 36, June 1955, p. 211-214.

What the chemical engineer can contribute to improvement of present processes or adoption of new ones, viz. the Linz-Dusenverfahren process and continuous casting. Table, graphs, photographs. 13 ref. (D general)

244-D. Continuous Casting at Atlas Steels, Ltd. John F. Black and F. W. Rys. *Iron and Steel Engineer*, v. 32, June 1955, p. 78-87; disc., p. 87.

Principles, requirements, equipment, operating procedures. Photographs, diagrams, tables. (D9, ST)

245-D. Extending Blast Furnace Stack Life After Appearance of Hot Spots. R. W. Sundquist. *Iron and Steel Engineer*, v. 32, June 1955, p. 88-94; disc., p. 94-95.

Detection procedures, installation of shell sprays, placing grout installation of cooling plates. Tables, photographs, diagrams. (D1)

246-D. Developments in Design of Modern Open Hearths. Jay J. Seaver. *Iron and Steel Engineer*, v. 32, June 1955, p. 96-99; disc., p. 99-100.

Provisions for sealing of furnaces to stop infiltration, positive draft, clean gas, improved checker brick and improved gas flow. Diagrams, photograph. (D2)

247-D. New Method Expands Slag for Aggregate Use. S. P. Kinney. *Iron and Steel Engineer*, v. 32, June 1955, p. 127-128.

Kinney-Osborne process for expanding blast furnace slag for use as a light-weight aggregate. Photographs, tables. (D1, A8)

248-D. Gary Blast Furnace Operates Successfully on 100 Pct. Sinter Burden. R. W. Sundquist. *Journal of Metals*, v. 7, June 1955, p. 737-741.

Results of approximately nine months of operation on No. 12 furnace at U. S. Steel Corp.'s Gary Works. Tables, graphs, diagram. 10 ref. (D1)

249-D. New Life for Metals. *Steel*, v. 137, July 4, 1955, p. 82-83.

Use of vacuum melting in producing purer metals. Improving mechanical properties of old alloys and production of new ones. Photographs, diagrams. (D8, C25)

250-D. The Oxygen Low-Shaft Furnace and Its Operation. H. Erne. *Henry Brutcher Translation No.* 3420, 16 p. (From *Stahl und Eisen*, v. 74, no. 25, 1954, p. 1644-1648.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 45-D, 1955. (D1, CI)

251-D. Deoxidation of Steel With Silicon and Manganese. I. S. Kulikov and A. M. Samarin. *Henry Brutcher Translation No.* 3501, 12 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954 no. 10, Oct., p. 23-30.) Henry Brutcher, Altadena, Calif.

Thermodynamic study of deoxidation of steel based on theory of real solutions for oxide systems. Calculation of composition of products of deoxidation with silicon and manganese at different concentrations of these elements in the bath. Tables, graphs. 6 ref. (D2, ST)

252-D. Effect of Moisture in Ores Upon the Reduction of Iron Oxides. V. T. Bragin. *Henry Brutcher, Translation No.* 3509, 12 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954, no. 10, Oct., p. 31-38.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 142-D, 1955. (D general, CI)

253-D. (Czech.) **Chief Parameters of Open-Hearth Furnaces.** Vladimir Balabanov. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 266-278.

Detailed literature survey and conclusions, based on the author's experience, relating to the fuel effects on furnace performance, specific heat consumption, gas velocity and the preheating and hearth areas. Tables, graphs, diagrams. 21 ref. (D2)

254-D. (French.) **Consumption of Water at Iron and Steel Plants.** Marcel Steffes and Pierre Mosel. *Centre Belge d'Etude et de Documentation des Eaux, Bulletin (trimestrielle),* 1955, no. 28, p. 91-98.

Study of supply, control and use of cooling, washery and feed waters. Diagrams, graphs, tables. (D general)

255-D. (French.) **Corrosion and Erosion of Ladle Bricks. Laboratory Testing Methods.** Ph. Visseriat. *Silicates Industriels,* v. 20, no. 5, May 1955, p. 200-204.

Physico-chemical theory of corrosion of bricks by molten steel. Study of ladles from point of view of refractory coatings. Five testing methods. (D9)

256-D. (German.) **Model Experiments on the Reversal of Flow in the Head of Open-Hearth Cold-Gas Furnaces.** Michael Hansen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 243-251.

Experiments on the optimum design of the head of above furnace for returning the rising air to the melt. Diagrams, graphs, tables. 3 ref. (D2)

257-D. (German.) **Reduction Experiments on Iron Ores.** Herman Schenck. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 682-690.

Measurement and effects of the permeability to gas and of the voids in the ore. Effect of particle size, speed and composition of gases, stability of ores and gangue on reducibility. Photographs graphs, micrographs. 14 ref. (D1)

258-D. (German.) **Results of an Experimental Operation of a Blast Furnace With Ferro-Coke.** Helmut Linde, Kurt Schwindt, and Max Paschke. *Stahl und Eisen,* v. 75 no. 11, June 2, 1955, p. 691-693.

Details of the blast furnace and experimental conditions. Data on composition of pig iron, increase of silicon content by use of ferrocoke, and coke consumption. Tables, graphs. 2 ref. (D1)

259-D. (German.) **Description and First Operation Data of the New Open-Hearth Steel Plant No. II at Huckingen.** Karl Georg Speith and Helmut Kobusch. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 694-699.

The plant, its erection, starting and first operation data, charging and melting capacity. Photographs, diagrams, graphs. (D2)

260-D. (Polish.) **Determination of the Optimum Conditions for the Reduction of Metallic Oxides by Carbon.** Emilian Iwanciw. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 131-153.

Mechanism of the process; experimental data include temperature and pressure relations to reduction. Graphs, tables. 9 ref. (D general, C general)

261-D. (Polish.) **Preparation of Casting Ladles for Tapping Steel Melts.** Wladyslaw Hansel. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 36-43.

Effects of operating variables on the life of ladle refractories; proper types and installation of refractory linings. Photographs, graphs, diagrams. 3 ref. (D9 ST)

262-D. (Polish.) **Economic Utilization of Ferromanganese in the Deoxidation of Steel.** Leonid Andrejew. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 45-47.

Steelmaking methods; comparisons of metal properties and burn-off losses of manganese when additions are made in the ladle and in the furnace. Tables. (D2, ST)

263-D. (Polish.) **Utilization of Electrodes in Electric Furnaces.** Eugeniusz Horoszko. *Wiadomosci Hutnicze,* v. 11, no. 4, Apr. 1955, p. 98-102.

Physical and chemical properties of electrodes; transportation, storage, installation and their behavior in furnaces. Table, diagrams. (D5, C21)

E
Foundry

243-E. Five Ways to Desulphurize. D. E. Parsons and S. L. Gertsman. *American Foundryman,* v. 27, June 1955, p. 60-65.

Results of investigation on the reduction of the sulfur content of gray iron by means of ladle treatment. Tables, graphs, micrographs. 6 ref. (E10, CI)

244-E. Quick Test for Melt Quality—Measures Gas Content. H. Rosenthal and S. Lipson. *American Foundryman,* v. 27, June 1955, p. 69-73.

Development of a gas content tester which has means for conveniently solidifying an aluminum sample under controlled reduced pressure. Gas content of the sample is qualitatively determined by examining the appearance of the surface of the sample. Photographs, diagram, graphs. 9 ref. (E25, A1)

245-E. How to Measure Molding Sand Blowability. Donald M. Murray. *American Foundryman,* v. 27, June 1955, p. 78-81.

Investigation of methods for evaluating the blowability of a sand-clay mixture. Photographs, graphs, tables. (E18)

246-E. Titanium Casting Metallurgy and Production Techniques. D. I. Sinizer and C. M. Adams, Jr. *American Foundryman,* v. 27, June 1955, p. 85-89.

Control measures for handling liquid titanium, refining and remelting, and skull melting. Gating methods, solidification time, casting furnace and furnace specifications. Graphs, tables, photographs, diagram. (E general, Ti)

247-E. Start Duplex Malleable Control With Raw Materials. Lawrence E. Emergy. *American Foundryman,* v. 27, June 1955, p. 90-95.

Control tips when using malleable pig iron in the duplex melt charge. Micrographs, graphs, tables. (E10, CI)

248-E. Mechanized Shell Molding for Efficient Foundry Production. *Automation,* v. 2, July 1955, p. 73-76.

A process where a mixture of sand, wetting agent and thermosetting phenolic resin is brought into contact with a heated pattern to produce a thin, tough and gas-porous shell mold. Diagram, photographs. (E16)

249-E. Foundry Problems and Principles. G. J. Rogers. *Foundry Trade Journal,* v. 98, May 19, 1955, p. 531-539.

Examples of experiences in foundry work illustrating broad principles and precepts. Photographs, diagrams. (E general)

250-E. Cores and Moulds by the CO_2 Process. A. Talbot. *Foundry Trade Journal,* v. 98, May 26, 1955, p. 559-568.

Comparison of producing castings by conventional practices of dry and green-sand molding and oil-sand coremaking, and by the CO_2 process. Examples and comparative costs. Photographs. (E21, E19)

251-E. Blown Shell Cores, Molds Produced at High Rates. W. G. Patton. *Iron Age,* v. 175, June 16, 1955, p. 92-95.

Machine blows molds and cores at the rate of 240 pieces per hour. Combines electrically heated split patterns or molds, sand resin blowing equipment and a heated mandrel. Photographs. (E19, E21)

252-E. Castability: Its Effect on Alloy Selection. I. Walter A. Dubovick. *Precision Metal Molding,* v. 13, June 1955, p. 44-45, 48-50.

Factors and conditions affecting castability. (To be continued.) (E15)

253-E. (French.) **Electromagnetic Stirring. Application to Desulfurization.** J. Duflot and M. Porcheray. *Revue de metallurgie,* v. 52, no. 4, Apr. 1955, p. 335-347.

Advantages of stirring method include more rapid chemical homogenization and acceleration of desulfurization. Tables, graphs. 3 ref. (E10, C1)

254-E. (German.) **Elastic Chill Mold for Casting Tensile-Test Bars.** K. Wittmoser. *Giesserei,* v. 42, no. 9, Apr. 28, 1955, p. 234-235.

Design of mold which does not exert tensile stress on the test bar. Diagrams, photograph, graph, table. (E11, Q27)

255-E. (German.) **The Use of Carbon-Dioxide Solidification Process in the Production of Cores on the Core Blower.** Winand Jansen. *Giesserei,* v. 42, no. 9, Apr. 28, 1955, p. 236-237.

Sand-binder mixtures, elimination of casting cracks by proper composition of core sands, economy of carbon dioxide solidification process. (E21)

256-E. (German.) **The Behavior of Molding Sand During the Process of Molding and Casting of Gray Iron, and the Testing of Molding-Sand Properties.** Wilhelm Wegener. *Giesserei,* v. 42, no. 10, May 12, 1955, p. 245-254.

Suggestions for a method of determining plasticity of sand; research results on effect of coal-dust additions on the formation of scabs and casting skins. Diagrams.

graphs, photographs, micrographs. 21 ref. (To be continued.) (E18)

257-E. (German.) **The Hot-Blast Cupola Furnace in the Steel Mill.** A. Dahlmann. *Giesserei*, v. 42, no. 10, May 12, 1955, p. 258-269.

Advantages and proper operation, effect of melting conditions on carbon content. Graphs. 4 ref. (E10)

258-E. (Hungarian.) **Manufacturing Problems of Large Steel Castings.** Zoltan Nagy. *Ontöde*, v. 6, no. 5, May 1955, p. 107-112.

Problems of shrinkage, formation of stresses and molding materials. Photographs, diagrams. (To be continued.) (E11, ST)

259-E. (Swedish.) **Preventing Gas Absorption From the Mold When Casting Copper Alloys.** Tore Malmberg. *Gjuteriet*, v. 45, no. 4, Apr. 1955, p. 45-50.

Suppressing reaction by using a mold material which will cause rapid solidification of the melt or by spraying a protective metal coating on the mold wall. Diagram, tables. 9 ref. (E19, Cu)

260-E. (Swedish.) **Water Absorption in Dried Cores.** Rolf Morén and Stig Bergman. *Gjuteriet*, v. 45, no. 4, Apr. 1955, p. 51-54.

Development of laboratory method to study water absorption under controlled conditions. Photographs, graphs, tables, diagrams. (E21)

261-E. The Feeding Requirements of Nodular Iron Castings. R. C. Shnay. *Canadian Metals*, v. 18, June 1955, p. 37-38.

Principles of risering, solidification characteristics, feeding distance, minimum riser dimensions. Tables, photograph. 3 ref. (E23, E22, E25, CI)

262-E. Die Casting in Aluminium. Frank G. Woollard. *Engineers' Digest*, v. 16, May 1955, p. 239-243.

Advantages of die casting over sand casting. Photographs. (E13, Al)

263-E. Place of Shell Moulding in the Foundry. B. H. C. Waters. *Foundry Trade Journal*, v. 98, June 2, 1955, p. 587-596.

The place of shell molding in the foundry and some of the possible competitive processes of shell molding. Techniques of the process. Photographs, diagrams, graphs, micrograph, tables. 8 ref. (E16)

264-E. Aspects of Steel Foundry Practice. H. Hart. *Foundry Trade Journal*, v. 98, June 9, 1955, p. 615-620.

Improvements in riser and gating techniques result in fewer rejects and stronger castings. Photographs, diagrams, graph. 2 ref. (To be continued.) (E22, CI)

265-E. Sand-Resin Cores, Molds Produced Automatically on Versatile Core Blower. W. G. Patton. *Iron Age*, v. 176, July 7, 1955, p. 91-93.

Gas-fired unit yields blown and cured cores of exceptional accuracy. Shell molds can be produced for stack molding and are accurate enough to permit the use of mechanical backup during pouring. Photographs. (E19, E21, E16)

266-E. Casting—1855 to 1955. *Iron Age (100th Anniversary Issue)*, v. 175, June 1955, p. 2B-14B.

Developments and prospects in materials and methods of melting, molding and mechanical handling. Photographs. (E general)

267-E. Large Titanium Castings Produced Successfully. R. A. Beall, F. W. Wood and A. H. Roberson. *Journal of Metals*, v. 7, July 1955, p. 801-804.

Conditions for casting metal, size of castings, materials, equipment and deep pool studies. Photographs, diagrams, graph. 7 ref. (E general, Ti)

268-E. Light Metals Die Casting Outlook and Review. J. C. Fox. *Light Metal Age*, v. 13, June 1955, p. 16-18, 28, 35.

Materials, equipment and methods for die casting aluminum and magnesium. (E13, Al, Mg)

269-E. Aluminium Casting Alloys in Great Britain. F. H. Smith. *Light Metals*, v. 18, June 1955, p. 179-181.

Review of growth of aluminum and aluminum alloy casting methods and casting quality in the past 50 yr. Graphs, tables. 7 ref. (E general, Al)

270-E. Quality Stainless Castings by Contour Chill Method. Roland E. Groethe. *Materials & Methods*, v. 41, June 1955, p. 110-111.

Application to television tube dies resulted in reduced cost and savings in material. Photographs, table. (E16, SS)

271-E. Pressure Die-Casting—A Recap. *Metal Industry*, v. 86, May 27, 1955, p. 439-441.

Favorable characteristics, fundamentals of process, qualities of castings, types of machines used. Photographs, diagrams. (To be continued.) (E13)

272-E. The Centenary and the Foundry. A. P. Fenn. *Metal Industry*, v. 86, June 3, 1955, p. 460-463.

Progress of the aluminum foundry industry and highlights of important stages in development of the art of production of aluminum castings. Photographs. (E general, Al)

273-E. Factors Influencing the Chilling of Cast Iron. W. J. Williams. *Metallurgia*, v. 51, no. 308, June 1955, p. 273-279.

Effects of chemical composition, nature of the charge, melting conditions, and inoculation on graphitization of gray iron. Diagram, photographs, micrographs, tables. 7 ref. (E25, CI)

274-E. Castability: Its Effect on Alloy Selection. II. Walter A. Dubovick. *Precision Metal Molding*, v. 13, July 1955, p. 40-43, 69-71.

Grading of materials according to castability with ratings from excellent to poor and a comparison of investment casting with wrought materials. (E15)

275-E. The Waterglass-Carbon Dioxide Molding Process for Gray-Iron Foundries. O. Gerstmann and E. Grohmann. *Henry Brutcher Translation No.* 3514, 7 p. (Abridged from *Giessereitechnik*, v. 1, no. 2, 1955, p. 16-17.) Henry Brutcher, Altadena, Calif.

How the process should be employed in a gray cast iron foundry. Diagrams, photograph, table. (E21, CI)

276-E. (Czech.) **Foundry Properties of Spheroidal Cast Iron.** Vaclav Oliverius. *Slévarenstvi*, v. 3, no. 5, May 1955, p. 130-133.

Properties, especially fluidity, and linear and volume contraction, molding techniques of spheroidal cast iron. Tables, graphs, photographs. 4 ref. (E25, CI)

277-E. (Czech.) **Fast Measurement of Mold Face and Core Moisture Content After Drying.** Miroslav Houst'. *Slévarenstvi*, v. 3, no. 5, May 1955, p. 135-138.

Determined by measurement of electric conductivity, using a simple inexpensive apparatus. Photographs, diagrams, tables, graphs. 4 ref. (E19)

278-E. (Czech.) **Casting of Complicated Tools.** Otakar Moravek. *Slévarenstvi*, v. 3, no. 5, May 1955, p. 138-141.

Possibilities of using lost wax precision casting for production of complicated tools. Most favorable conditions for production of molds for wax patterns as well as wax mixtures. Photographs. 4 ref. (E15, TS)

279-E. (Czech.) **Corner Connection of Core Boxes.** Vit Toman and Josef Grguric. *Slévarenstvi*, v. 3, no. 5, May 1955, p. 141-142.

To reduce wood consumption, Czechoslovakian foundries use two methods of corner connections—hinge connections, with screw drawing, and eccentric locking. Diagrams, photographs. 4 ref. (E21)

280-E. (Italian.) **Lost-Wax Casting Process.** W. H. Sulzer. *Fonderia*, v. 4, no. 4, Apr. 1955, p. 137-144.

Survey of latest improvements in method; materials, other than wax, for the patterns and casting procedure. Metals and alloys for casting, mechanical properties, purposes for which used, weldability. Photographs, tables, diagrams. (E15, Q general, K9)

F

Primary Mechanical Working

135-F. Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. IV. C. H. Hartwig. *Industrial Heating*, v. 22, May 1955, p. 952, 954, 956, 958.

Effects of larger air gap and increased power input on temperature, power and current curves. Table, diagrams. (To be continued.) (F21)

136-F. Successful Modernization of Soaking Pits. H. W. Hodges. *Industrial Heating*, v. 22, May 1955, p. 983-984, 986.

Improvements made and benefits derived. Photographs. (F21)

137-F. Practical Aspects of the Cold-Rolling of Narrow Steel Strip. T. W. Hood. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 189-200 + 2 plates.

Practices in the cold rolling of narrow strip in mild, high-carbon, and stainless steels. Hydraulically loaded mills are specially mentioned, with practical problems such as coolant, rolls, roll grinding, rollneck bearings, etc. Table, diagrams. 9 ref. (F23, CN, SS)

138-F. Precision Forging of Jet-Engine Blades. Edward B. Wells. *Machinery*, v. 61, June 1955, p. 192-199.

Vacuum melting of heat resistant alloys, electrical resistance upsetting of billets, induction and high-speed gas heating and impacting are some of the latest developments employed in the production of compressor blades and turbine buckets for jet engines. Photographs. (F22)

139-F. (English.) **A Note on the Calculation of the Cross-Section of the Buffer of a Bloom Shears.** L. Gascuel. *Acier, Stahl, Steel*, v. 20, No. 4, Apr. 1955, p. 171-172.

Includes diagrams, photograph. (F29)

140-F. (German.) **The New Blooming Mill of the Böhler & Co., AG, at Kapfenberg.** Guido Bersa and Stefan Glavitza. *Stahl und Eisen*, v. 75, no. 10, May 19, 1955, p. 624-629.

Description of blooming mill, breaking down mill, auxiliary plants, furnaces and electrical equipment. Lubricating, descaling, operation of

the mills and operational results. Photographs, diagrams. 2 ref. (F23, ST)

141-F. (Hungarian.) **Calculation of the Curving of Rolls.** Elemér Köves. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 222-226.

Calculation examples made with duraluminum ingots during hot rolling, taking into consideration rolling pressure and heat expansion of the rolls. Diagrams, graphs, tables. 21 ref. (F23, Al)

142-F. Best Reel Performance Is Obtained When Current Regulator Operates on the Generator. A. J. Winchester. *Blast Furnace and Steel Plant,* v. 43, June 1955, p. 647-649.

Winding reel control on hot and cold mills in the metalworking industry. Diagrams, graphs, photograph. (F23)

143-F. The Metallurgical Control of High-Quality Aluminium Forgings. T. E. Mureh. *Engineers' Digest,* v. 16, May 1955, p. 237-238, 243.

Outlines methods whereby light-alloy forging industry endeavors to maintain requirements of the aircraft industry. Photographs. (F22, Al)

144-F. Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. V. C. H. Hartwig. *Industrial Heating,* v. 22, June 1955, p. 1160, 1162, 1164, 1166.

Equipment and accessories for heating ingots to forging temperatures. Diagrams. (F21, ST)

145-F. Manufacture and Properties of Large Forgings. Adolph O. Schaefer. *Industrial Heating,* v. 22, June 1955, p. 1168 + 10 pages.

Composition of forging alloys; applications; production problems. Tables, photographs, diagrams. (To be continued.) (F22, AY)

146-F. New Merchant Bar Mill Equipped for Maximum Versatility. R. A. Peterson. *Iron Age,* v. 175, June 9, 1955, p. 85-87.

Mill consists of a reheating furnace, primary three-high breakdown mill, intermediate mill unit of four two-high stands, and finishing mill unit with two two-high stands in staggered arrangement. Photographs. (F23, ST)

147-F. How to Improve the Quality of Deep Drawing Steel. E. R. Morgan and J. C. Shyne. *Iron Age,* v. 175, June 23, 1955, p. 91-94.

Avoidance of strain aging and stretcher strains by control of composition, omission of temper rolling before shipping, or stabilization of dissolved nitrogen. Diagrams, graphs. (F23, N7)

148-F. Modern Rolling Mills Aid Study of High Strength Materials. J. I. McMartin. *Iron Age,* v. 175, June 23, 1955, p. 104-106.

Equipment and operating details of heavier, sturdier laboratory rolling mills, offering greater control and increased flexibility to meet modern metallurgical needs. Improved mills designed to handle new high-hardness and high-strength materials. Photographs. (F23)

149-F. Rolling of Shapes in Alloy and Tool Steel Grades. Ernest E. Davis and A. H. Highley. *Iron and Steel Engineer,* v. 32, June 1955, p. 59-64; disc., p. 64-66.

Pass designs for a given alloy and a given section, rolling details. Typical sections. Diagrams, photograph. (F23, AY)

150-F. Operation of Magnetic Amplifier Controlled Tandem Mills. J. C. Peth and J. W. Brinks. *Iron and Steel Engineer,* v. 32, June 1955, p. 69-76; disc., p. 76-77.

Advantages of magnetic amplifiers over rotating types. Components, operation and maintenance of magnetic amplifiers. Photographs, diagrams, graphs, table. (F23)

151-F. Effect of Certain Primary Mill Heating and Rolling Practices on Slab Surface Quality. H. B. Wishart and C. A. Hope. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 811-812.

Three factors of processing variables, amount of reduction between ingot and slab, slab finishing temperatures, influence of roll changes. Photographs, graphs. (F23, ST)

152-F. Extrusion of Aluminium. I. G. Slater. *Metal Industry,* v. 86, June 3, 1955, p. 464-468.

Extrusion presses, extrusion dies, furnaces, impact extrusion, future outlook. Table, photographs. (F24, G5, Al)

153-F. Rolling Aluminium. R. T. Staples. *Metal Industry,* v. 86, June 3, 1955, p. 468-471.

Survey of the scope of sheet rolling in the aluminum industry. Graph, tables, photograph. (F23, Al)

154-F. Aluminium Forgings. E. W. Peel. *Metal Industry,* v. 86, June 3, 1955, p. 472-475.

Use in aircraft design and other industries where there is a demand for the high strength, ductility, soundness, dimensional accuracy, and other qualities of the light-alloy die forgings. Photographs. (F22, Al)

155-F. The Rolling of Metals and Alloys. V. A Practical Method of Calculating Rolling Loads and the Establishment of Rational Rolling Schedules. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 459-464.

Use of practical method of calculating rolling loads, and a demonstration, by examples, of its application to the analysis and design of rolling schedules when no coiler or decoiler tension is employed. Graphs, tables. 8 ref. (F23)

156-F. Press Plant Specially Built for Large Aircraft Forgings. *Steel Processing,* v. 41, June 1955, p. 349-360.

Equipment and operating procedures of Aluminum Co. of America's 35,000 and 50,000-ton forging presses. Photographs, diagrams, table. (F22, Al)

157-F. Upset Forgings. Modern Methods and Design. II. M. W. Lamprecht. *Steel Processing,* v. 41, June 1955, p. 367-374, 390-391.

Forging of tubing and gear blanks, unusual multiple operation forging. Diagrams. (F22)

158-F. Aluminum Cold Forgings. R. A. Quadt. *Western Machinery and Steel World,* v. 46, June 1955, p. 82-84.

Value in industry for high production, design simplification, cost reduction. Table, photographs. (F22, Al)

159-F. Measurement of Temperature in the Drawing of Bar and Wire Stock and the Problem of Supercritical Drawing Speeds. W. Reichel. *Henry Brutcher Translation No.* 2670, 17 p. (From *Stahl und Eisen,* v. 70, no. 25, 1950, p. 1141-1146.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 20-F, 1951. (F27, F28, S16, ST)

160-F. (German.) **Swedish Intermediate, Small Section and Wire Rolling Mills of Novel Design.** Erik M. Norlindh. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 700-709.

Design of a multiple-purpose mill train for medium and fine steel sections as well as for wire rod. Roller guides, repeaters, looping channels, grease bath couplings, three-high and interchangeable two-high housing chucks, chucks for vertical rolls. Diagrams, photographs. 2 ref. (F27, F23, ST)

161-F. (German.) **Effect of Increased Requirements as to Output and Quality on the Design, Operation, and Control of Rolling Mill and Forge Furnaces.** Berthold von Sothen. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 709-718.

Causes, kinds and extent of the requirements to be met by heating, annealing and heat treating furnaces. Correlations between furnace capacity, heat absorbing power, heat transmission and products to be heated. The process of heating, heating time, temperature-time curves of heating, through-heating, loss by burning, skin decarburization, condition of scale, features of development of the design. Diagrams, photographs. 15 ref. (F21, J23)

162-F. (German.) **Comparison Tests on the Work Hardening in Flat Rolling and Drawing of Round Wire.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 757-767.

Effects of the wire material, of the roll diameter and of the reduction on the work hardening in flat rolling. Interpretation of the differences determined in work hardening. Diagram, tables, graphs, micrographs. 20 ref. (F23, F28)

163-F. (German.) **The Aptitude of Different Emulsions to the Cold Rolling of Steel Strip.** Hans Pannek. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 767-769.

Characteristics, execution and results of tests and conclusions drawn from the operation. Tables. (F23, ST)

164-F. (German.) **Recent Investigations on the Drawing and Extrusion of Steel Bars. II.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 769-776.

Effect of working conditions on deformation, effect of the bearing length on power required in drawing and on swelling under different working conditions. (F27, ST)

165-F. (German.) **Production of Extremely Thin Metal Wires.** H. Bittel. *VDI Zeitschrift,* v. 97, nos. 15-16, May 15, 1955, p. 486-488.

Electrolytic methods of reducing the diameters of wires. Diagrams, graphs. 7 ref. (F28)

166-F. (Polish.) **Position of the Neutral Angle in Hot and Cold Rolling Processes.** Zygmunt Wusatowski. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 11-42.

Analysis, verification, amplification of various formulas for the neutral angle; equations for homogeneous compression and slipping friction along contacting arc. Formulas for cold rolling without tension and hot rolling without spreading. Tables, graphs. 16 ref. (F23)

167-F. (Polish.) **Modern Methods of Rolling Rods Into Rivets and Bolts.** Roman Wusatowski. *Wiadomosci Hutnicze,* v. 11, no. 1, Jan. 1955, p. 4-14.

New and old rolling machines and techniques compared; machine designs, roll types, groove designing; roller pressures, heating methods, thread rolling. Photographs, diagrams. 11 ref. (F23, G11, G12, CI, AY)

168-F. (Polish.) **How to Lower the Operating Costs of the Rolling Mill.** Karol Jelonek. *Wiadomosci Hutnicze,* v. 11, no. 1, Jan. 1955, p. 15-18.

Effect of calorific value of gas and amount of excess air on heating furnace efficiency; economic aspects of billet size and weight. Table, graphs. (F23)

G

Secondary Mechanical Working

158-G. Controlled Stretch-Forming. *Aircraft Production,* v. 17, June 1955, p. 234-236.

Method of producing consistent workpieces by means of a servo-control system. Diagrams, photograph. (G9)

159-G. Turret Machining. *Aircraft Production,* v. 17, June 1955, p. 237-241.

Methods of sequence control, operational control, turret control and screw cutting. Photographs, diagrams. (G17)

160-G. Powder-Metal Cutters Promise New Milling Economy. Horace Frommelt. *American Machinist,* v. 99, June 6, 1955, p. 128-129.

Disposable milling cutters sintered with thin carbide blades in place may cost less than regrinding, provide longer tool life, and faster cutting. Photographs, diagrams. (G17, H15)

161-G. Cope Talks on Draw Dies. XXIX. Apply Correct Clearances and Speed When Drawing Stainless. Stanley R. Cope. *American Machinist,* v. 99, June 6, 1955, p. 130-133.

Shaving, bending and forming dies, lubricants, cemented-carbide die parts, press speeds. Diagrams, tables. (G4, SS)

162-G. Computer Techniques Extended to Machine Tool Control. *Electrical Manufacturing,* v. 55, June 1955, p. 124-132, 330, 332.

New director control systems using static devices and switches without electrical contacts. Examples of extension of automaticity to sequencing controls. Photographs, graph, diagrams. (G17)

163-G. Residual Stresses in Heavy-Wall Cylinders. J. H. Faupel. *Franklin Institute, Journal,* v. 259, May 1955, p. 405-419.

Residual stress resulting from autofrettage of steel cylinders appears to be related to the hardness and/or structure of the steel employed. Tables, graphs, diagram. 3 ref. (Q25, ST)

164-G. Dies Travel With Strip in New High-Speed Press. E. C. Beaudet. *Iron Age,* v. 175, June 16, 1955, p. 83-85.

Press design incorporates dies which move with the strip and continuous coil feeding. Advantages include less setup time, variable feed lengths, and low maintenance. Photographs. (G2)

165-G. Sliding Friction Test for Metalworking Lubricants. W. J. Wojtowicz. *Lubrication Engineering,* v. 11, May-June 1955, p. 174-177.

Procedure that gives pertinent information regarding ability of a lubricant to decrease friction and to inhibit metallic welding during deep drawing. Experimental data confirm practical experience and indicate that there exists a specificity between lubricants and metals. Tables, graph, diagram. 14 ref. (G21, Q9)

166-G. Maintenance of Water-Soluble Machining Coolants During Use. J. A. Prevel. *Lubrication Engineering,* v. 11, May-June 1955, p. 178-179.

Physical and chemical methods of control which extend the life of the coolants. (G21)

167-G. Application and Grade Selection of Tungsten Carbide Tooling. Edward J. Novack. *Machine and Tool Blue Book,* v. 50, June 1955, p. 157-162.

Three groups of tungsten carbides for machining purposes, including the edge wear resistant grades for cutting plastics, cast iron, bronze, aluminum and other nonferrous and abrasive materials, the crater resistant types, and the intermediate group having more or less balanced compositions. Table, diagrams. (G17, W)

168-G. High Feed Rate Milling Made Practical With Solid Carbide Blades. R. C. Legge. *Machine and Tool Blue Book,* v. 50, June 1955, p. 168-170, 172.

Discusses trend toward heavy solid carbide mechanically held inserts in single and multiple-point cutting tools, and describes their advantages. (G17)

169-G. "Chem-Mill" on a Production Basis at North American. Manuel Sanz. *Machinery,* v. 61, June 1955, p. 156-163.

Application of etching process which enables the convenient reduction of sections on metal parts after forming or forging without any change in important dimensions. Photographs. (G17)

170-G. Electronic Control Makes Boring Mill Automatic. *Metalworking Production,* v. 99, May 20, 1955, p. 910-912.

Integral electronic copying equipment enables flywheels to be profile turned in an automatic cycle. Photographs, diagram. (G17)

171-G. New Rail-Grinder Train—Takes Off the Rough Spots. *Railway Track and Structures,* v. 51, June 1955, p. 30-33.

As train moves along at about 2 m.p.h., 96 power-driven abrasive wheels, mounted on special truck assemblies beneath cars, grind out corrugations and other surface irregularities on both rails simultaneously. Photographs. (G18)

172-G. Automatic Turret Lathe Control. Leonard Hesse. *Screw Machine Engineering,* v. 16, June 1955, p. 40-41.

Turret lathe part produced by magnetic tape control of the machine tool with automatic compensation for tool adjustment. Photographs, diagram. (G17)

173-G. How to Buy Cutting Fluids. John A. Boyd. *Steel,* v. 136, June 6, 1955, p. 80-82.

Factors to be considered in buying and testing cutting fluids. Photographs, graphs, table. (G21)

174-G. New Trend in Carbide Tooling. A. S. Rogers. *Tooling and Production,* v. 21, June 1955, p. 77-80.

Analysis of features, advantages and limitations of the new tools. Photographs. (G17)

175-G. (English and Spanish.) Metal Machining, IV. Work Materials and Tool Materials. W. Alfred Carter. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 69-73, 75-77.

Effect of structure of work pieces on the type of tool material used. Photograph, diagram, micrograph. (G17)

176-G. (Dutch.) Deep-Drawing Investigation by the Metal Institute. T.N.O. J. H. Zaat. *Metalen,* v. 10, no. 9, May 15, 1955, p. 117-121.

Testing methods for sheet metals and testing method designed by the institute. Diagrams. 1 ref. (G4, Q23)

177-G. (French.) Contribution to the Study of the Stamping of Metals. Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 354, Feb. 1955, p. 47-77.

Mechanical characteristics of stamping determined by observing metal deformations and by analysis of tension and stamping diagrams. Micrographs, tables, diagrams, graphs, photographs. (To be continued.) (G3)

178-G. (Polish.) Electrospark Treatment of Wire-Drawing Dies Made of Sintered Carbides. Zygmunt Steininger. *Hutnik,* v. 22, no. 3, Mar. 1955, p. 87-89.

Design of electrospark machining equipment. Use and operation of the device and its advantages over mechanical polishing methods. Diagrams, circuit diagram, photograph, table. 17 ref. (G17, L10, C-n)

179-G. What Is the Best Screw-Machine Stock? Richard F. Harvey. *American Machinist,* v. 99, June 20, 1955, p. 113-115.

Results of extensive production tests on the machinability of C1119 steel. Photographs, tables, diagram, micrographs. (G17, CN)

180-G. Toxic Materials Machined Safely. Donald P. O'Neil. *American Machinist,* v. 99, July 4, 1955, p. 125-129.

Design of hoods, allowable concentrations in the air and operating rules that should be followed when machining beryllium. Diagrams, photographs, tables. (G17, Be)

181-G. What Size Nose Radius? Robert E. Nixon. *American Machinist,* v. 99, June 20, 1955, p. 138-139.

How nose radius is constructed, what it does in the operation of the tool, how to determine what size radius should be used for different conditions and materials. Diagrams, graphs. (G17, C-n)

182-G. The Grinding of Titanium Alloys. C. T. Yang and M. C. Shaw. *ASME, Transactions,* v. 77, July 1955, p. 645-660.

Influence of a wide variety of operating and grinding-wheel variables reveals the most important quantities to be grinding wheel speed, type of abrasive, and grinding fluid. Table, graphs, diagrams, micrographs, photographs. (G18, Ti)

183-G. Helical Carbide Cutters. *Canadian Metals,* v. 18, June 1955, p. 47, 50, 52.

Problems in the manufacture and use of the cutters are correct type of steel for cutter body, economies of tipping, brazing difficulties, grinding techniques. Photographs, diagrams. (G17, WC)

184-G. Die Design Solves Small Part Production Problems. Federico Strasser. *Iron Age,* v. 175, June 9, 1955, p. 78-80.

Design of punch for small parts, made from thin stock and with closely spaced holes, results in better production at lower costs. Diagrams. (G2)

185-G. Machine Tools—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2E-20E.

Development and prospects of machine tools and their accessories. Photographs. (G17)

186-G. Presswork—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 21-161.

Review of progress in hot and cold pressing and forging. Photographs. (G1, F22)

187-G. What Happens When Speeds Are Increased? R. Tourret. *Metalworking Production,* v. 99, May 27, 1955, p. 930-932.

Data published on the effect of increased cutting speeds. Graphs. 22 ref. (G17)

188-G. Automation. *Metalworking Production,* v. 99, June 10, 1955, p. 1013-1076.

Developments during the last nine years. Machine tools, control systems, inspection procedures, computers. (G17, A5)

189-G. Solve Special Shell Problems With Proved Die Design Methods. XXVI. Stanley R. Cope. *Metalworking Production,* v. 99, June 17, 1955, p. 1102-1105.

Design of drawing dies for forming a shell with corrugations, two levels, or pockets. Diagrams. (G4)

190-G. Contribution to the Theory of Frictional Wear of Turning Tools. E. Bickel. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 53-57; disc., p. 58.

Four phenomena of cutting edge failure considered according to cause and effect. Graphs. (G17, Q9)

191-G. Low Temperature Cooling, a Means of Increasing Cutting Tool Life. G. Pahlitzsch. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 65-69.

Tests indicated a 42% extension of tool life and an increased savings in manufacturing and tool costs. Graphs, photograph. (G21)

192-G. New Method for Evaluating Coolant Efficiency. F. Eugene. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 70-80.

Evaluation of coolant effect in machining operations may be satisfactorily made through measurement of specific tool abrasion. Diagrams, tables, photographs, graphs. 4 ref. (G21)

193-G. The Fundamentals of Progressive Tooling. J. A. Grainger. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 405-409, 452.

Basic fundamentals, types, relief of the strip on follow-on tools, consideration of the number of stages in a tool, scope of progressive tooling, die construction. Photographs, diagrams. (To be continued.) (G17)

194-G. Spin Drawing Rolls Away Costs. William E. Dean. *Steel,* v. 136, June 27, 1955, p. 84-86.

It is possible for one machine to produce the same deep drawn parts normally required of a line of presses; equipment investment is less, costly dies are eliminated. Photographs. (G13)

195-G. Save on Snagging. John A. Mueller. *Steel,* v. 136, June 20, 1955, p. 110-112.

Effect on production rate, power consumption and wheel performance as determined by reduced wheel diameter, pressure on the wheel, and open and dense structure of snagging wheels. Photographs, graphs, table. (G18)

196-G. Ultrasonic Impact Grinding. Ralph Moschella. *Steel Processing,* v. 41, June 1955, p. 378-381, 399.

Principles, equipment, methods, applications. Diagrams, photographs. (G18)

197-G. Machinability Testing of High-Phosphorus Gray Iron. Edward A. Loria. *Western Machinery and Steel World,* v. 46, June 1955, p. 76-81.

Tests comprise tool wear turning tests on individually cast rings, constant pressure turning tests on arbitration bars, drill penetration tests on small rectangular bars and tapping energy tests on very small locknut castings. Photographs, graphs, tables, micrographs. 7 ref. (G17, CI)

198-G. Electrospark Marking of Hardened Tools. F. F. Cherepanov. Henry Brutcher, Altadena, Calif. 4 p. (Condensed from *Stanki i Instrument,* v. 25, no. 5, 1954, p. 29-30.) Henry Brutcher, Altadena, Calif.

Development of a method for the marking of mass-produced tools which has proved superior to all other methods. Table, photographs. (G17)

199-G. Machining of Holes by the Electrospark Process. V. E. Dumpe. *Henry Brutcher Translation No.* 3496, 8 p. (Abridged from *Vsetnik Mashinostroeniya,* v. 34, no. 12, 1954, p. 51-55.) Henry Brutcher, Altadena, Calif.

Study of electrospark machining of holes in steel for rate of metal removal, dimensional accuracy and surface roughness of the holes machined, using a large and small electrospark unit. Graphs, photographs, table. 1 ref. (G17, ST)

200-G. New Process of Production of Metal-Powder Tools for the Electrospark Machining of Metal Parts. E. A. Volodin and L. A. Kovsharova. *Henry Brutcher Translation No.* 3497, 5 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 12, 1954, p. 56-57.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 67-G, 1955. (G17, H general, Cu)

201-G. Influence of Lubricants Upon the Surface Flow of Metal. S. Ya. Veiler. *Henry Brutcher Translation No.* 3519, 6 p. (From *Doklady Akademii Nauk SSSR,* v. 99, no. 6, 1954, p. 1025-1027.) Henry Brutcher, Altadena, Calif.

Study of influence of different lubricants upon tangential force, microstructure and microhardness through flow in surface zone. Photographs, tables. 4 ref. (G21, M27, Q29, ST, Cu)

202-G. (French.) **A study of the Punching of Metals.** Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 110-133.

Details of tests on influence of the nature and surface state of the punched metal, and on heterogeneity of soft openhearth steel. Tables, graphs. (To be continued.) (G2, CN)

203-G. (French.) **Contribution to the Study of the Stamping Metals.** Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 356, Apr. 1955, p. 155-172.

Influence of play between punch and die, of stamping rate, metal thickness and die lubrication. Diagrams, tables, graphs, photograph. 18 ref,. (G3)

204-G. (German.) **Several Methods of Economical Belt Grinding.** G. Pahlitzsch and H. Windisch. *Metall,* v. 9, nos. 11-12, June 1955, p. 496-499.

Effect of smooth and grooved supporting disks on grinding efficiency. Photograph, graph, table. 4 ref. (To be continued.) (G18)

205-G. (German.) **Oxy-Propane Flame Cutting.** G. Oldenburg. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 124-128.

Chemical properties of various liquefied gases, comparison of oxygen consumption, heat evolution, and combustion rate of acetylene and propane, effect of cutting angle on cutting rate, advantages of cutting with propane. Graphs, diagrams, tables. (G22)

206-G. (German and French.) **The Machining of Light Metals by Cutting.** Jean-Jacques Desherault. *Aluminium Suisse,* v. 5, no. 3, May 1955, p. 76-92.

Effect of shape and properties of materials, machines, cutting tools, cutting conditions and lubrication on machinability; classification of light metals; description of different types of machining operations. Diagrams, graphs, photographs, tables. (G17, Al)

207-G. (German and French.) **Machining Light Metals With Hard-Metal Cutting Tools.** E. Frey and P. Frey. *Aluminium Suisse,* v. 3, no. 1, 1955, p. 93-96.

Proper conditions for lathing, milling, and reaming. Tables, photographs, diagram. (G17, Al)

208-G. (Polish.) **High-Speed Machining and Cutting With Kolesow-Type Machine Tools.** Jan Kaczmarek. *Przeglad Techniczny,* v. 75, no. 3, Mar. 1954, p. 94-98.

Calculation of factors in cutter angle, depth and rapidity of feed, opposition to cutting, materials being machined, heat generated, machining time and forces. Graphs, diagrams, photograph. 8 ref. (G17, ST, CI)

209-G. (Pamphlet.) **The Effect of the Cutting Fluid When Turning Titanium.** PB 111478. 15 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.

Cutting speed-tool life of each of the fluids is plotted as a curve in the report and the effectiveness of each fluid is evaluated. (G21, G17, Ti)

H

Powder Metallurgy

131-H. Mechanism of Material Transport During Sintering. Raymond F. Walker. *American Ceramic Society, Journal,* v. 38, June 1955, p. 187-197.

Evaporation-condensation mechanism; surface and volume diffusion; macroscopic flow mechanisms; viscous and plastic flow; significance of sintering atmosphere. Graphs, micrographs, tables, diagrams. 36 ref. (H15)

132-H. Sintering Powdered Metals. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 85-86.

Effects of surface tension, volume and porosity. Diagram. (H15)

133-H. Nickel Alloys Made by Powder Metallurgy Techniques. *Metallurgia,* v. 51, no. 307, May 1955, p. 215-217.

Closer control over composition possible in the production of nickel and nickel alloys by powder metallurgy methods results in improvement in properties, particularly valuable in the electronic field. Tables. 1 ref. (H general, Ni)

134-H. Finish Compressor Blades to 6-8 Micro-Inches. *Precision Metal Molding,* v. 13, June 1955, p. 59-62.

Processes in producing a sintered compressor blade, including pressing, heat treating, grinding, cleaning, polishing and plating. Photographs. (H general, Fe, Cu)

135-H. Magnetic Powder Cores. C. Gordon Smith. Paper from "Magnetic Alloys and Ferrites". George Newnes. p. 159-170.

Development, applications and permeability of iron powders, iron-aluminum-silicon alloys, nickel-iron and related alloy powders. Graph, photograph, table. 18 ref. (H11, P16, Fe, Ni, Al)

136-H. (Russian.) **New Method of Determining the Grain Size and Unit Surface Area of Powders Used in Powder Metallurgy.** B. V. Deriagin, N. N. Zakhavaeva and M. V. Talaev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 881-886.

Deriagin method and apparatus (based on filtration of rarefied air through the powder). Equations given. Photographs, graph, table. 11 ref. (H11, Cu, Fe, Al, Pb)

137-H. Titanium-Carbide-Base Cermets for High-Temperature Service. K. Pfaffinger, H. Blumenthal and F. W. Glaser. *American Society for Testing Materials, Preprint No.* 94b, 1955, 10 p.

Development, physical properties and production procedures of titanium-carbide-base cermets containing 25 to 65% of nickel-chromium or nickel-cobalt-chromium binder. Tables, graphs, photographs. 7 ref. (H general, SG-h, Ti)

138-H. Titanium-Carbide Products Produced by the Infiltration Technique. Leonard P. Skolnick and Claus G. Goetzel. *American Society for Testing Materials, Preprint No.* 94g, 1955, 7 p.

Technique permits use of low pressures for compacting the powders, making possible direct pressing of complex shapes. Infiltration *per se* permits the production of void-free bodies of remarkably true shape and close dimensional tolerances, and in many aspects is strikingly similar to precision casting. Table, photograph, graphs, micrographs. 5 ref. (H16, Ti)

139-H. Titanium Powder Metallurgy. H. W. Dodds. *Metal Industry,* v. 86, June 10, 1955, p. 489-490.

Fabrication of parts by press formed compacts. Graphs, table, diagram, photographs. (H14, Ti)

140-H. Methods and Techniques for the Determination of Specific Surface by Gas Adsorption. A. S. Joy. *Vacuum,* v. 3, July 1953, p. 254-278.

Review of experimental procedures for determination of specific surfaces and relative surface areas by measuring volume of gas adsorbed on the surface of the solid. Tables, graphs, diagrams. 87 ref. (H11)

141-H. Infiltration of Porous Tungsten With Copper and Silver. (Part III of "Sintered Electric Contact Materials".) W. Rutkowski and S. Stolarz. *Henry Brutcher Translation No.* 3481, 20 p. (From *Prace Glownego Instytutu Metalurgii,* v. 4, no. 1, 1952, p. 67-81.) Henry Brutcher, Altadena, Calif.

Numerical data on influence of various factors, such as particle size of tungsten powders, compacting pressure, sintering temperature, and infiltration time, upon density of tungsten skeletons before and after infiltration; porosity of tungsten skeletons; amount of copper, etc. infiltrated; hardness; electrical conductivity; loss of weight on arcing. Tables, micrographs. 5 ref. (H16, W, Ag, Cu)

142-H. (Polish.) Fayalite Sinter Compacts. Zdzislaw Kotas. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 43-45.

Fayalite sinter compact is defined as an iron powder product in which, during sintering, there appears a ferrous orthosilicate ("fayalite") of the composition $2FeO \cdot SiO_2$ which acts as a bonding agent. Although more fuel is required for sintering this material, its advantages include strength and resistance to weathering. Graphs. 3 ref. (H15, Fe)

143-H. (Russian.) Influence of the Electrolyte Concentration on the Temperature Effect at the Cathode During the Electrolytic Deposition of Metallic Powders. D. N. Gritsan and A. M. Bulgakova. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 649-652.

Emperical equations are developed for electrolytic production of cadmium, copper, and zinc powders. Graphs, table. 6 ref. (H10, Cd, Cu, Zn)

J

Heat Treatment

136-J. The Heat Treatment of Carburising Steels. F. P. Heard. *Australasian Engineer,* 1955, Apr., p. 44-50.

Selection of carburizing steels and heat treatment for machinability. Gas and pack carburizing procedures. Tables, diagrams, graphs, micrographs. 8 ref. (J28, G17, CN, AY)

137-J. Magnetic Recording Measures Cooling. Rodney P. Elliott. *Frontier,* v. 18, Summer 1955, p. 17-19.

During quenching the cooling rate at a given point can be determined by measuring the rate of voltage change at the thermocouple junctions. Photographs. (J26, S16, CN, Ti)

138-J. Individual Heat Treatment of Quality Rolls. *Industrial Heating,* v. 22, May 1955, p. 976-978.

Annealing, normalizing, quenching, tempering and combination practices. Photographs. (J general)

139-J. Better Copper Tubing Starts With Accurately Controlled Annealing. Victor Peterson. *Iron Age,* v. 175, June 2, 1955, p. 87-89.

Accurate control over annealing cycles will give the grain size uniformity and scale-free surfaces so essential to the drawing qualities of copper tubing. Photographs, micrographs. (J23, Cu)

140-J. Heat Treatment to Precision Limits. *Mechanical World and Engineering Record,* v. 135, May 1955, p. 228-229.

Heat treatment and case hardening of repetition parts to close limits in plants in which unique control equipment leaves no room for error. Photographs. (J general)

141-J. Uniform Hardness for 410 Stainless Castings. W. B. F. Mackay. *Precision Metal Molding,* v. 13, June 1955, p. 40-41, 88.

Study of the effectiveness of various heat treatments. Photographs, micrograph, graphs. (J general, Q29, SS)

142-J. Heat Treating Aluminum. I. Wrought Alloys. W. A. Anderson. *Steel,* v. 136, June 6, 1955, p. 83-86.

Data on annealing, quenching, aging, cold treatment and reheating of the alloys. Photographs, graphs, tables. (J general, Al)

143-J. Heat Treating Aluminum. II. Castings. W. A. Anderson. *Steel,* v. 136, June 13, 1955, p. 146-148.

Furnaces used, time, quenching, aging, stresses, annealing, short cuts and techniques. Graphs, photograph, micrograph, table. (J general, Al)

144-J. Heat Treating Dies in Salt Bath Furnaces Aids Production of Fastenings at H. M. Harper Co. K. G. Hookanson. *Industrial Heating,* v. 22, June 1955, p. 1153A-1154, 1156, 1158.

Die hardening furnaces and heat treat cycles. Photographs, digaram. (J2, TS)

145-J. Heat Treating—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2C-14C.

Progress and outlook for fuels, furnaces and procedures. Photographs. (J general)

146-J. Change to Gas-Carburizing Improves Piston Pins. R. E. Haislip. *Materials & Methods,* v. 41, June 1955, p. 140-143.

Shorter production cycle resulted and uniformity increased markedly through each pin and from pin to pin. Photographs, tables, diagrams. (J28)

147-J. Some Recent Furnace Installations. Applications in the Fabrication and Heat Treatment of Metals. *Metallurgia,* v. 51, no. 308, June 1955, p. 283-300.

Indicates trends of development in furnace design by showing and describing briefly a few of the more recent installations in England and the purposes for which they are being applied. Photographs, diagrams. (J general)

148-J. Bright Hardening and Bright Tempering of Corrosion-Resistant and High-Temperature Alloys. T. W. Harker. *Metal Treating,* v. 6, May-June 1955, p. 2-4.

Heat treating equipment and cycles for fastenings and bolts for elevated temperature use. Photographs, micrograph. (J26, J29, SG-g, h)

149-J. Commercial Heat Treating Shops in France. Bernard Jousset. *Metal Treating,* v. 6, May-June 1955, p. 12, 14-16, 37.

Equipment, materials, procedures. Photographs. (J general)

150-J. A Review of Salt Bath Carburizing. I. E. N. Case. *Metal Treating,* v. 6, May-June 1955, p. 18-19.

Applications, advantages, processing details. Photographs. (To be continued.) (J28, J2, ST)

151-J. Heat Treating Magnesium. M. E. Brooks. *Steel,* v. 137, July 11, 1955, p. 88-91.

Treatment of magnesium for the maximum production of castings, extrusions, sheet and plate products. Photographs, micrographs, tables. (J general, Mg)

152-J. Gas Carburizing—a Controlled Production Tool. F. E. Russ. *Steel Processing,* v. 41, June 1955, p. 383-390.

Equipment, materials, methods. Photographs, graph. (J28)

153-J. Commercial Annealing and Quenching Plus Tempering of Cold-Drawn Steel Bars With Special Consideration of Scaling, Decarburization, Heating Rate, and Temper Brittleness. II. Quenching Plus Tempering of Cold-Drawn Steel. W. Hulsbruch. *Henry Brutcher Translation No.* 2965, 18 p. (From *Stahl und Eisen,* v. 70, no. 15, 1950, p. 647-653.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 220-J, 1950. (J23, J29, ST)

154-J. Rapid Gas Carburizing by Induction Heat. A. D. Assonov, K. Z. Shepelyakovskii and P. A. Lankin. *Henry Brutcher Translation No.* 3468, 10 p. (Condensed from *Vestnik Mashinostroeniya,* v. 34, no. 6, 1954, p. 56-60.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 253-J, 1954. (J2, ST)

155-J. Cold Treatment of Chrome-Tungsten-Manganese Tool Steel. L. I. Gardina. *Henry Brutcher Translation No.* 3505, 6 p. (From *Vestnik Mashinostroeniya,* v. 33, no. 11, 1953, p. 54-55.) Henry Brutcher, Altadena, Calif.

Study of effect of cold treating of a toolsteel upon its mechanical properties and cutting performance, based on hardness tests, micrographic analysis, determination of magnetic properties, slow bend, and torsion impact tests. Tables, graph. (J26, Q general, P16, TS)

156-J. Low-Frequency Heating of Aluminum Billets. H. Rohn. *Henry*

Brutcher Translation No. 3478, 10 p. (From *Aluminium*, v. 30, no. 7, 1954, p. 298-300.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 256-J, 1954. (J2, Al)

157-J. (German.) **Induction Hardening and Its Applications.** H. Voss. *Schweissen und Schneiden*, v. 6, special no., 1954, p. 173-180.

Demonstrates the numerous uses of surface hardening by heating the hardenable metal with induced medium or high-frequency current. Photographs, tables. 7 ref. (J2)

158-J. (Polish.) **Vessels for the Annealing of Rolled and Drawn Objects.** Kazimierz Janas. *Wiadomosci Hutnicze*, v. 11, no. 1, Jan. 1955, p. 18-20.

Properties of materials used for annealing vessels, factors affecting service life, effect of design of vessel on annealing time and temperature. Diagrams. (J23, T5, ST)

K

Joining

243-K. Structural Spotwelding. William R. Cain. *Aircraft Production*, v. 17, June 1955, p. 242-247.

Applications in airframe manufacture to large fuselage skin-panels and floor structures. Graphs, photographs, table, diagrams. 3 ref. (K3, Al)

244-K. Carbon Dioxide—Will it Replace Argon and Helium for Inert Arc Welding? *Industry & Welding*, v. 28, June 1955, p. 59-61, 94.

Cost comparisons and the use of carbon dioxide in conjunction with argon. Photograph, diagram. (K1)

245-K. Titanium Can Be Brazed and Soldered. Orville T. Barnett. *Industry & Welding*, v. 28, June 1955, p. 62-66.

Methods of brazing and soldering, fluxes, heating time and temperatures. Photographs, tables. (K8, K7, Ti)

246-K. How and Where to Use Spot Welding. *Industry & Welding*, v. 28, June 1955, p. 71-74, 76.

Comprehensive practical information on spot welding. Includes step-by-step instructions. Diagrams. (K3)

247-K. The DC Rectifier Arc Welder. *Industry & Welding*, v. 28, June 1955, p. 86 + 5 pages.

Design features, ripple effect, applications, economy. (K1)

248-K. New Welding Process Deposits Metal Faster. *Iron Age*, v. 175, June 16, 1955, p. 90-91.

Development of an automatic submerged-arc welding process which deposits metal up to five times as fast as comparable welding methods and at half the power cost. Photographs. (K1)

249-K. New Resistance Welder Fabricates Wide Wire Mesh at High Speed. *Iron Age*, v. 175, June 2, 1955, p. 100-101.

Resistance welding machine produces wire mesh in widths up to 13 ft. from continuous coils of 4 to 14-gage wire. Photographs. (K3)

250-K. Weldability of Stainless Steel. Helmut Thielsch. *Machine Design*, v. 27, June 1955, p. 157-164.

Design guide to alloy selection, electrode and rod specification and heat treatment procedures. Photographs, tables, micrograph. (K9, SS)

251-K. Convair Procedure in Quality Welding. Fred Monahan. *Machinery*, v. 61, June 1955, p. 200-203.

Welding procedure that covers the engineering of steel weldments, planning of welding operations, design of tooling, material procurement and inspection, heat treatment and other phases of the process. Photographs. (K1, AY)

252-K. 30° Pipe Bevel Best for Pipelines. L. J. Cunningham and S. V. Williams. *Oil and Gas Journal*, v. 54, May 30, 1955, p. 70-73.

Compared with recently revised A.P.I. Standards, which call for a 37½° bevel, the smaller bevel provides a better weld, requires less welding time, and results in greater savings. Micrographs, photographs, diagrams. (K1)

253-K. Flash Butt-Welding for Rails. *Railway Track and Structures*, v. 51, June 1955, p. 34-38.

Process developed in Europe now adapted for use in this country is currently producing continuous rails on the Santa Fe. Photographs, diagram. (K3, ST)

254-K. Tape Control of High Production Riveting. Thomas H. Speller. *Tooling and Production*, v. 21, June 1955, p. 83-86.

Includes diagrams, photographs. (K13)

255-K. How to Use Semi-Automatic Submerged Arc Welding. R. A. Wilson. *Welding Journal*, v. 34, June 1955, p. 535-541.

Advantages of process when used where semi-automatic welding is applicable. Speeds four times greater than conventional hand welding are possible. Photographs, graphs, diagrams. (K1)

256-K. Design and Application of Edge-Ring Projection Welding. Chester A. Czohara. *Welding Journal*, v. 34, June 1955, p. 551-558.

International Harvester applies resistance welding process in the manufacture of spring brackets. Photographs, diagrams, micrograph, tables. (K3)

257-K. Inert Gas Welding of Stator Packs. F. J. Pilia. *Welding Journal*, v. 34, June 1955, p. 559-567.

Requirements for welding, factors influencing and controlling costs, machine design suggestions for stator pack welding. Photographs, diagrams, nomograms. (K1)

258-K. Oxy-Acetylene Flame Keeps Heavy Equipment in Top Shape. J. Dean Davidson. *Welding Journal*, v. 34, June 1955, p. 574, 576, 578.

Oxy-acetylene heating, welding and cutting have a great part in lowering the repair and operating costs of heavy equipment. Photographs. (K2, G22)

259-K. Some Welding Research Problems. *Welding Journal*, v. 34, June 1955, p. 265S-269S.

Compilation to provide university research workers with a list of current welding research problems and to provide project committees with suggestions as to the needs of industry. 4 ref. (K general, A9)

260-K. A Mathematical Analysis of the Temperature Distribution During Flash Welding. E. F. Nippes, W. F. Savage, H. Suzuki and W. H. Chang. *Welding Journal*, v. 34, June 1955, p. 271S-285S.

Proposed methods for choosing an adequate mean value of thermal diffusivity for a given material and for evaluating the amount of critical burn-off necessary to establish the stabilized temperature distribution. Graphs, diagrams, tables. 6 ref. (K3)

261-K. Effects of Alloying Elements on Welds in Titanium. II. G. E. Faulkner. *Welding Journal*, v. 34, June 1955, p. 295S-312S.

Experimental alloys which contained individual and combined additions of most of the commercially important titanium alloying elements were welded and tested to show how alloying elements affect the properties of welded joints in the experimental alloys. Alloying elements studied in the investigation were aluminum, chromium, iron, manganese, molybdenum and vanadium. Photographs. (K general)

262-K. (German.) **Practical Measures Against Shrinking Effects on Welded Constructions From the Standpoint of Economy.** Richard Malisius. *Schweissen und Schneiden*, v. 7, no. 4, Apr. 1955, p. 119-133.

Proposals to the welding engineer for the control of shrinkage stresses and deformations. Photographs, diagrams, graphs, table. 6 ref. (K9, Q25, ST)

263-K. (German.) **Design and Operation of a Portal-Type Projection Welding Machine.** R. Schmarz. *Schweissen und Schneiden*, v. 7, no. 4, Apr. 1955, p. 136-140.

Scope of problems and design data, welding machine, ignitron control, preparation of workpieces. Diagrams, photographs, table. (K3)

264-K. (German.) **Investigations on the Melting Rate of Manual Arc Welding Electrodes.** H. Frankenbusch. *Schweissen und Schneiden*, v. 7, no. 4, Apr. 1955, p. 140-143.

Melting rate expressed in k.g. per hr. as the most suitable index for electrode performance; investigation of factors which affect electrode-melting rate. Photograph, graphs, table. 14 ref. (K1)

265-K. (German.) **Development and Present Situation in Gas-Welding of Rails.** F. Fries. *Schweissen und Schneiden*, v. 7, no. 4, Apr. 1955, p. 144-151.

Compositions of rail steels, effect of melting method on weldability, strength properties of weld joints, importance of and factors to be considered in deposition welding for repair. Tables, photographs, diagrams. 18 ref. (K2, K9, Q23, ST)

266-K. (German.) **Considerations on Failures of Welded American Ships.** H. Dohrmann. *Schweissen und Schneiden*, v. 7, no. 4, Apr. 1955, p. 151-158.

Variable effect of riveting and welding on susceptibility to failures. Difference in internal stresses between riveting and welding as constructional element. Diagrams, photographs. 4 ref. (K general, Q26)

267-K. (German.) **Development and Present Status of Autogenous Rail Welding.** F. Fries. *Schweissen und Schneiden*, v. 7, no. 5, May 1955, p. 190-198.

Methods of joining straight rails, rail crossings and switches. Diagrams, photographs. 4 ref. (K general)

268-K. (German.) **Advances in the Field of Welding and Cutting.** K. K. Zeyen. *Schweissen und Schneiden*, v. 7, no. 5, May 1955, p. 200-207.

Review of literature on effect of hydrogen on weld cracking and quality of weld seams. Tables, photographs. 20 ref. (To be continued.) (K general, Q26)

269-K. (German.) **Modern Welding Electrodes.** W. Hummitzsch. *Schweisstechnik*, v. 9, no. 3, Mar. 1955, p. 26-28.

Comparison of properties and economic efficiencies of principal types. Tables, graphs. (K1)

270-K. (German.) **Welding Electrodes for Joining Unalloyed and Low-Alloyed Steels.** Alfred Schmidt. *Schweisstechnik*, v. 9, no. 3, Mar. 1955, p. 28-31.

Classification, description and specifications according to new German standards; composition and properties of Austrian electrodes. Tables. (K1, CN, AY)

271-K. (German.) **Problems of Soldering Techniques.** J. Colbus. *Schweisstechnik,* v. 9, no. 3, Mar. 1955, p. 31-35.

Effect of temperature, time and flux on the diffusion of silver into sheet copper. Diagrams, micrographs, table. (K7, N1, Ag, Cu)

272-K. (German.) **Hard Soldering Metals That Are Difficult to Solder.** A. Schwarz. *VDI Zeitschrift,* v. 97, no. 13, May 1, 1955, p. 379-380.

Suggestions on the soldering of aluminum bronze, beryllium copper, stainless nickel-chromium and chromium steels, chromium carbides, molybdenum, titanium, zirconium, tantalum and aluminum-to-copper joints. (K7)

273-K. Ferrous Welding Metallurgy With Special Reference to the Welding of Cold-Bent Steel. H. O'Neill. *British Welding Journal,* v. 2, June 1955, p. 241-246.

Welding of steels and cast iron with reference to grain size effects; principles underlying the selection of elements for high-tensile weldable steels; details of strain aging and cracking effects in the welding of cold bent steels. Micrographs, photographs, table. 20 ref. (K1, K2, K3, ST, CI)

274-K. Resistance Welding of High Temperature Alloys. P. M. Howard and D. Wilcox. *Canadian Metals,* v. 18, June 1955, p. 58-62.

Principles, effect of material properties, welding of high-temperature alloys, welding of dissimilar metals, cleaning, quality control. Table, photographs, diagrams. (K3)

275-K. The Welding of Aluminium and Its Alloys. J. F. Lancaster. *Engineers' Digest,* v. 16, May 1955, p. 227-232.

Research progress, welding in production, jigs and fixtures, weld defects, recent developments. Photographs, graphs, table. 13 ref. (K general, Al)

276-K. Joining Aluminium by Soft Soldering. H. C. Watkins. *Engineers' Digest,* v. 16, May 1955, p. 233-236.

Soldering techniques, solder composition, base alloy composition, application of aluminum soldering. Photographs. 12 ref. (K7, Al)

277-K. Production Brazing of Aluminum-Sheathed Heating Elements. Charles A. McFadden. *Industrial Heating,* v. 22, June 1955, p. 1138 + 6 pages.

Semi-automatic brazing machine has timer for automatically throttling the burners after brazing alloy has flowed into joint. Photographs. (K8, Al)

278-K. Automatic Brazing in Molten Salt? *Industry & Welding,* v. 28, July 1955, p. 46-48, 50.

Parts assembled with brazing alloy in place are immersed in molten salt. As soon as immersed joint has reached bath temperature—a matter of seconds—it is removed, quickly quenched or slowly cooled in air as required. Photographs, diagram. (K8)

279-K. How to Use Pulsation Spot Welding. *Industry & Welding,* v. 28, July 1955, p. 59-60, 62.

How to determine timing, tip diameters, pressures and secondary currents. Using this method in welding chromium-molybdenum steels doubled the tensile strength of welds. Diagram. (K3, Q23)

280-K. Welding, Brazing, Joining—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2L-16L.

Historical review of developments in methods and equipment. Future possibilities. Photographs. (K general)

281-K. New Techniques for Spot-welding Aluminum. William R. Gain. *Light Metal Age,* v. 13, June 1955, p. 19 + 5 pages.

Optimum values obtained for spot spacing, edge margin, row spacing and single spot shear strength to satisfy the requirements of ultimate tensile strength and joint fracture in aeronautical welding. (K3, Q23, Al)

282-K. The Production of Continuous Rail-Lengths by Flash Butt Welding. *Machinery (London),* v. 86, June 3, 1955, p. 1188-1191.

Advantages of this method include reduced track maintenance, reduced tire wear on rolling stock, quieter and smoother running, and reduced arcing and consequent burning of moving contacts in electrified systems. Photographs. (K3)

283-K. Welding Titanium Without Filler Rod. Alan V. Levy and Robert Wickham. *Materials & Methods,* v. 41, June 1955, p. 116-118.

Recent experience with "no-rod-added" welds reveal improved joint ductility and results in less grinding. Technique may be extended to titanium alloys. Photographs. (K1, Q23, Ti)

284-K. Added Life for Brazing Fixtures. Charles Emery and Paul Goetcheus. *Steel,* v. 136, June 27, 1955, p. 82-83.

Lasting quality comes from the right alloys and good design. Photographs. (K8)

285-K. Arc Welding for Small-Lot Production. II. Equipment and Processes. Arthur H. Allen. *Tool Engineer,* v. 35, July 1955, p. 83-87.

Selection of manual or automatic processes. Photographs, tables. (K1)

286-K. Method for Determining Correct Amount of Silver Alloy Brazing Wire. Reference Sheet. *Tool Engineer,* v. 35, July 1955, p. 119-120, 123.

Wire selection for maximum joint strength and optimum use of materials. Diagrams, nomograph. (K8)

287-K. Ultransonic Welding of Aluminum. J. Byron Jones, Carmine F. De Prisco, and John G. Thomas. *U. S. Atomic Energy Commission,* DP-107, Feb. 1955, 48 p.

Preliminary investigation to provide significant information relative to the merits of the process in fabricating ribbed aluminum components for heat exchange purposes, which would provide strength approximating parent metal, and withstand corrosion and thermal cycling. Graphs, tables, diagrams, photographs. (K6, Al)

288-K. Aluminium in Norwegian Shipbuilding. *Welding and Metal Fabrication,* v. 23, June 1955, p. 211-216.

Problems and procedures in metal-arc welding. Photographs, tables. (K1, T22, Al)

289-K. Sigma Welding in Ship Construction. D. B. Tait. *Welding and Metal Fabrication,* v. 23, June 1955, p. 221-223.

Automatic assembly of light-alloy structures. Welding equipment and procedures. (K1, T22, Al)

290-K. Submerged Automatic Arc Welding of Nickel-Chromium Alloys. F. S. Bugrii. *Henry Brutcher Translation No.* 3495, 4 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 8, 1954, p. 85-86.) Henry Brutcher, Altadena, Calif.

Specific effects of carbon and sulfur in alloys upon results of welding experiments; corrosion resistance of specimens; quality of welds obtained. Tables, photographs. (K1, Ni)

291-K. (English.) **The Effects of Contact Resistance Upon Spot Welding.** Isamu Ukita and Tatsuya Hashimoto. *Kyoto University, Engineering Research Institute Technical Reports,* v. 5, no. 3, Mar. 1955, p. 53-73.

Theoretical and experimental examination of the effects of contact resistance on the properties of a weld such as shear strength, temperature distribution and growth of the weld. Photographs, graphs, diagrams, tables. 4 ref. (K3)

292-K. (German.) **The Development of Sigma-Welding and Its Application to Carbon Steels.** H. E. Rockefeller and Peter R. R. Scarr. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 11-15.

Technical development of inert-gas welding with tungsten electrode and with consumable electrode; stability and control of arc in sigma welding; problems and present procedures of welding carbon steels. Photographs, graphs, tables. (K1, CN)

293-K. (German.) **Modern Evaluation of Welding in the Design of Boilers and Tanks.** W. P. Kerkhof. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 66-69.

Stresses in pressure vessels at normal and elevated temperatures; effect of annealing, stresses at base of notch or crack, and plate thickness on strength of weld joints; importance of preheating and subsequent heat treatment. Graphs. (K general, Q25, J general)

294-K. (German.) **Correct and Incorrect Application of the Most Important Processes of Oxy-Acetylene Techniques.** K. W. Sippell, K. Boeckhaus, H. Kunz, W. Lenk and R. Pfeiffer. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 70-79.

Proper and improper methods of gas welding, flame cutting, low-temperature stress-relieving, flame straightening and flame cleaning. Photographs, table, diagrams, graph. (K2, G22, J1, F29)

295-K. (German.) **Correct and Incorrect Application of Electric-Arc Welding.** M. Komers, Denis S. Förster, E. Kauhausen, H. Neumann, H. Schmidt-Bach, E. Sudasch, R. Thoma and Mennen. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 79-88.

Proper choice of electrodes, amperage and source of current; correct handling of different types of electrodes; preparation of weld joints; good welding practice; auxiliary equipment; principles of automatic protective-gas and repair welding. Graphs, photographs, diagrams. (K1)

296-K. (German.) **Resistance Welding of Thin Profiles of Large Cross Section.** K. Seyderhelm. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 101-105.

Effect of current distribution, total current, heat losses of variable wall thicknesses on quality of the weld, effect of the welding process on structure. Diagrams, graphs, photograph, micrographs. 27 ref. (K3)

297-K. (German.) **Possibilities and Limitations of Gluing Metals.** Ernst Rubo. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 106-116.

Techniques of joining metals to metals and metals to nonmetals with hardenable synthetic resins; advantages of process; mechanical testing and strength properties of glued joints. Diagrams, photographs, tables, graph. 19 ref. (K12)

298-K. (German.) **The Present Status of the Thermit Welding Process.** Wilhelm Ahlert. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 116-124.

Metallurgical principles, proper and improper procedure, effect of heat treatment on properties of thermit welds, practical examples. Photographs, graphs, micrographs, table. (K4)

299-K. (German.) **The Welding Behavior of Corrosion Resistant Chromium-Nickel Steels.** F. Rapatz. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 128-133.

Methods of testing chromium-nickel steels for susceptibility to intercrystalline corrosion and hot shortness; method of detecting and avoiding stress-crack corrosion; effects of carbon content and heat treatment. Photographs, micrographs, tables, graphs. (K general, R1, J general, SS)

300-K. (German.) **Sigma Welding and Its Application, Especially in the Processing of Steels.** Lothar Wolff. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 134-140.

Principle and basic requirements for sigma welding, control of wire feed, difficulties of welding soft and unsilicized carbon steels, type and voltage of electric current, composition of welding rod, surface condition of the material, properties of sigma welds and economy of the process. Photographs, tables, graphs, diagrams. 3 ref. (K1, CN)

301-K. (German.) **Problems of Soldering and Brazing. II.** J. Colbus. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 140-147.

Definition of terms, temperature measurements, strength properties of soldered joints, effects of fluxes with and without wetting agents. Diagrams, photographs, graphs, tables. 11 ref. (K7, K8)

302-K. (German.) **The Present Status of Rail Welding.** M. de Miro-Ramonacho. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 148-158.

Advantages and objections to continuous rails, critical evaluation of different methods of welding and laying rails, modern practice of rail welding in different countries. Graphs. 169 ref. (K general)

303-K. (German.) **Stud Welding.** K. L. Zeyen. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 159-167.

Principle of stud welding, special characteristics of "Cyc-Arc" and "Nelson" processes and their advantages. Photographs, table, diagrams. 10 ref. (K1)

304-K. (German.) **The Electric Weld Arc and Its Importance to Electrical High-Temperature Processes.** Johannes Wotschke. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 168-173.

Actions of the electric arc and its energies in welding, smelting and melting. Diagrams, graphs. 7 ref. (K1, C21, D5)

305-K. (German.) **Welding Electrodes for Welding Unalloyed and Low-Alloyed Steels.** Alfred Schmidt. *Schweisstechnik,* v. 9, no. 4, Apr. 1955, p. 37-39.

Preparation of weld test bars and composition of welding electrodes. Diagrams, tables. (K1, ST)

306-K. (German.) **Problems of Soldering Techniques.** J. Colbus. *Schweisstechnik,* v. 9, no. 4, Apr. 1955, p. 42-45.

Effect of width of soldered joint, fracture resistance of base material and solder, metallurgical changes from soldering and solder-base material bond on the mechanical properties of soldered joint. Graphs, table. 30 ref. (K7, Q general)

307-K. (German.) **Optical Stress Measurements on Glass-Metal Bonds at Higher Temperature.** Horst Herrmann. *Zeitschrift für angewandte Physik,* v. 7, no. 4, Apr. 1955, p. 174-176.

Special furnace microscope arrangement to study stresses in glass-metal bonds under polarized light. Diagram, photograph, graphs. 3 ref. (K11, Q23)

308-K. (German.) **Studies on the Bonding of Metals.** Hermann Winter. *Zeitschrift für Flugwissenschaften,* v. 3, nos. 3-4, Mar.-Apr. 1955, p. 87-94.

Experiments on the bonding of metals with "Redux" and "Araldit". The results of static and dynamic tests are given. Diagrams, graphs. (K12)

309-K. (Russian.) **Carbon and Silicon Alloying of the Low-Carbon Steel in Electrodes for Welding of Cast Iron.** A. N. Shashkov. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 1-5.

Calculations of thickness and composition of alloying layer of coating, rates of solution, retarding and other factors in relation to flux-shielded metal-arc welding. Graphs, diagrams, phase diagram. 8 ref. (K1, ST, CI)

310-K. (Russian.) **Effect of Flowability of Welding Bath on the Geometrical Form of the Welded Seam and on the Technological Applicability of the Welding Process.** A. A. Erokhin. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 5-9.

Relation of flowability to current, arc voltage and rate of welding for different electrodes. Effect of fluxes. Graphs, tables, diagrams, micrograph. 5 ref. (K1)

311-K. (Russian.) **Electrodes for Welding and Cutting Metal Under Water.** T. I. Avilov. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 9-10.

Proportion of gases (H_2, CO, CO_2) in which arc burns, gas pressure and other factors. Strength and microstructure of welds with respect to compositions of electrodes used. Oxygen cutting. Graphs, tables, micrograph. (K1, G22, M27)

312-K. (Russian.) **Flux-Shielded Metal-Arc Welding of Open-Hearth Furnace Framework Strutting.** D. P. Lebed' and I. S. Miroshnichenko. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 11-13.

Parameters for welding procedure, including current strength, feed of electrode wire, depth of flux bath, etc. Chemical composition and mechanical properties of base metal, electrodes and welds. Tables, diagram, micrographs. 4 ref. (K1, Q general, ST)

313-K. (Russian.) **Gas Welding of Brass-L62.** G. A. Asinovskaia. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 15-18.

Microstructural changes in weld and base metal, mechanical properties of weld. Diagram, photographs, micrographs, tables, graphs. 4 ref. (K2, M27, Q general, Cu)

314-K. (Russian.) **Arc Welding of Brass.** M. M. Bort. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 18-21.

Mechanical properties and microstructure of specimens arc welded with and without heat treatment; chemical composition of base metal and welded-on metal; welding procedure; comparison with gas welding results. Tables, micrographs, photographs. (K1, Q general, M27, Cu)

L

Cleaning, Coating and Finishing

418-L. Conductive Coating for Aluminum. John A. Connor and R. Stricklen. *Electrical Manufacturing,* v. 55, June 1955, p. 105-107.

Contact resistance and corrosion properties of aluminum components are improved by chromate surface conversion treatment applied by immersion at room temperature. Table, photographs, graphs. (L14, Al)

419-L. Finishes That Stand Metal Forming. F. D. Johnson. *Industrial Finishing (London),* v. 8, May 1955, p. 276, 278, 280.

Properties, application, baking and formulation of finishes for coating bottle caps, toys, etc. before metal forming. Photographs. (L26)

420-L. Stainless Steel Finishing. *Industry & Welding,* v. 28, June 1955, p. 78-82, 152.

Grinding and polishing procedures. Abrasive selection, lubrication, wheel speed. Photographs. (L10, SS)

421-L. Anodized Coatings: What They Are—How They Behave. II. C. C. Cohn. *Iron Age,* v. 175, June 2, 1955, p. 95-98.

Thickness tests, equal diffusion rates, film properties and oxide film growth. Photographs. (L19, Al)

422-L. The Formulation of Priming Paints for Structural Steel. J. C. Hudson and J. F. Stanners. *Journal of Applied Chemistry,* v. 5, Apr. 1955, p. 173-188.

Interim report of a BISRA subcommittee recommends primer of red lead, white lead and asbestine in linseed oil for weathered steel. Tables, graphs, diagram, photographs. 4 ref. (L26, ST)

423-L. Petroleum Base Rust Preventives. *Lubrication,* v. 41, June 1955, p. 61-72.

Theory of rusting of iron and steel; preservative lubricants; preservative coatings; surface preparation prior to application of petroleum-base rust preventative; application of preventatives. Tables, photographs, micrographs. (L26, R general)

424-L. Design for Plating. J. B. Mohler. *Machine Design,* v. 27, June 1955, p. 165-168.

Types of coating, coating specifications, variation in deposit thickness, plating corners and engineering uses of plating. Tables, diagrams, photographs. 4 ref. (L17)

425-L. Surface Treatment and Finishing of Light Metals. VI. Anodizing of Aluminum. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, June 1955, p. 91-98.

More important industrial anodic processes and their applications. Table, graphs, diagram. 51 ref. (L19, Al)

426-L. Standardization of Chromium Bath Tests on a Bent Cathode in the Hull Cell. II. Study of C.P. Variations Under Simple Conditions. Robert H. Rousselot. *Metal Finishing,* v. 53, June 1955, p. 99-102.

Method of plotting variations of the covering power with a satisfactory degree of precision, taking into account factors relating to the base metal and progressively varying the factor concerning the bath. Diagram, table, graphs. 7 ref. (L17, Cr)

427-L. Barrel Finishing. *Metal Industry,* v. 86, May 20, 1955, p. 419-421.

Tumbling equipment, media, operation, loading. Photographs. (L10)

428-L. Chrome Plating for the Small Shop. J. B. Mohler. *Metalworking Production,* v. 99, Apr. 15, 1955, p. 677-679.

Advantages of setting up a chromium plating department in a small shop. Diagrams, graphs. (L17, Cr)

429-L. Epoxy Coatings for Metal Decorating Finishes. M. A. Glaser, E. J. Bromstead and G. L. Weaver. *Modern Lithography,* v. 23, June 1955, p. 77, 79, 157.

Four classes of epoxy resin materials for use in metal decorating. Table, photograph. (L26)

430-L. Electrolytically Formed Coating for Magnesium Alloys. *National Bureau of Standards, Technical News Bulletin,* v. 39, June 1955, p. 77-79.

Salt spray resistant surface on magnesium by a.c. deposition in a simple electrolyte. Tables, photographs. (L17, Mg)

431-L. Corrosion Resistant Paints. Henry L. Beakes. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 27, June 1955, p. 366-370.

Properties of film, surface pretreatment, painting tips. 14 ref. (L26)

432-L. Electrostatic Paint Spray for Automatic Finishing. Irving Feldman. *Precision Metal Molding,* v. 13, June 1955, p. 63, 65-66.

A system that incorporates, in a closed circuit, cleaning, surface preparation, drying, spray painting and baking. Photographs. (L26)

433-L. Chromium Without Microporosity Plated Directly Onto Base Metal. *Precision Metal Molding,* v. 13, June 1955, p. 67-68.

Plating process that permits the deposit of a dense, nonporous layer of chromium directly onto the base metal, such as die cast alloys, steels, copper, etc. Photographs. (L17, Cr)

434-L. Fine-Scale Structures Produced on Aluminium by Electropolishing or Etching. N. C. Welsh. *Research (Supplement),* v. 8, June 1955, p. 28-29.

Study of effects of anodic treatment in several electrolytes under conditions which would produce in some cases polished surfaces and in others oxidation with little polishing action. Graph, micrograph. 11 ref. (L13, Al)

435-L. The Inert-Gas Metal-Arc Overlay Process. C. R. Felmley. *Welding Journal,* v. 34, June 1955, p. 542-550.

Factors that affect penetration with inert-gas metal-arc welding. Photographs, diagrams. (L24)

436-L. (English and Spanish.) Hot Spray Painting. R. H. Warring. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 81-83.

By using heat, the spray contains a considerably greater proportion of solids which, with proper technique, do not sag or run; overspray is considerably reduced, with an over-all saving in production time and costs. Graph, table, diagrams. (L26)

437-L. (French.) Study of Stria Resulting From Hot-Dip Tinning. S. Chatel, P. Kozakevitch, and P. Rocquet. *Métaux, Corrosion-Industries,* v. 30, no. 354, Feb. 1955, p. 78-87.

Mechanism of formation and methods of elimination of stria formed during the coating of tin plate. Tables, diagrams, micrograph. 3 ref. (L16, Sn)

438-L. (German.) Several Technological Properties of Flame-Sprayed Zinc Coatings. E. Gebhardt and H. D. Seghezzi. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 162-164.

Report of experimental results on the mechanical properties of wire and powder-sprayed specimens as a function of specimen cross section and oxygen concentration of fuel mixture. Tables. 10 ref. (L23, Zn)

439-L. (Italian.) Thickness and Piercing Voltage of an Anodized Coating. A. Prati. *Alluminio,* v. 24, no. 2, Mar. 1955, p. 111-119.

Electric equipment employed to check the electrical properties of an anodized layer. Diagrams, tables, graphs. 7 ref. (L19, Al)

440-L. (Polish.) Structure of Layers of Sintered Carbides Applied by the Electro-Sparking Method. Edmund Bryjak and Witold Missol. *Hutnik,* v. 22, no. 3, Mar. 1955, p. 77-86.

Relation of surface smoothness and thickness of applied layer to the electrical parameters of the process. Radiographic investigations of cobalt content and W_2C in the layer. Micrographs, tables, diagram. 14 ref. (L general, C-n)

441-L. (Russian.) Mechanism of Silver Electropolishing. A. T. Vagramian and A. P. Popkov. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 297-300.

Investigation by means of polarization curves; relation of anode polarization change to current density. Polarization curves, diagram. (L13, Ag)

442-L. (Russian.) Copper Plating of Mirrors Silvered by the Glazing Method. R. G. Lepilina and M. T. Belousov. *Legkaia Promyshlennost',* v. 15, no. 5, May 1955, p. 41-43.

Conditions of galvanic copper plating; current density, etc., thickness and quality of resulting copper film. (L17, Cu)

443-L. Stainless Flatware Proves That Beauty Results From Mechanized Polishing. Rupert Le Grand. *American Machinist,* v. 99, July 4, 1955, p. 106-109.

Selection of materials, segregation of facilities and steps used to minimize the polishing operations required to make a finished product. Photographs. (L10, SS)

444-L. Barrel Finishing. H. B. Underhill. *Canadian Metals,* v. 18, June 1955, p. 54, 56, 57.

Advantages include savings due to reduction in direct labor costs and revealing of flaws by the cleaning and conditioning action of the process. Photographs. (L10)

445-L. Preliminary Evaluation of Protective Coating Systems. R. W. Flournoy. *Corrosion,* v. 11, July 1955, p. 289-290.

Tests of coatings formulated from organic materials with high electrical resistance, including determination of thickness, flaws, adhesion and chemical resistance. Photographs. (L26)

446-L. Finishes for Aluminium. A. W. Brace. *Engineers' Digest,* v. 16, May 1955, p. 244-247, 252.

Methods of producing finishes of both utilitarian and aesthetic value. Photographs, tables. (L general, Al)

447-L. Surface Finishing Aluminum Castings. John H. Keating. *Finish,* v. 12, July 1955, p. 33-36.

Polishing and buffing operations and equipment. Diagrams. (L10, Al)

448-L. Lined Steel Shipping Containers for Hard-to-Hold Products. L. J. Nowacki. *Industrial Packaging,* v. 1, June 1955, p. 15-18.

Development of single trip lined containers with emphasis on materials of the epoxy-phenolic type. Possible use of laminated linings in the future. Photographs. 1 ref. (L26, ST)

449-L. Recent Developments in Chromium Plating. H. Silman. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 33-44.

Solutions, catalysts, baths, processes, barrel chromium plating, tampon finishing and plant requirements. Graphs. 17 ref. (L17, Cr)

450-L. Practical Bright Nickel Plating. T. E. Such. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 45-64.

Advantages and disadvantages of bright as compared with dull nickel plating, merits of various plating solutions and methods for their control and purification, recommended cleaning cycles. Tables, graphs, diagram. 17 ref. (L17, Ni)

451-L. Some Aspects of Sulphuric Acid Anodizing to Specifications D.T.D. 910C. V. F. Henley. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 65-70.

Technical difficulties in meeting British specifications include factors influencing the choice of the electrolyte concentration, importance of agitating the electrolyte, "spotting out" of dyed coatings caused by galvanic action, dimensional changes occurring during anodizing, and a proposed method for maintaining the original dimensions. 3 ref. (L19, Al)

452-L. High-Output Plating Machine Incorporates Job Shop Flexibility. Alfred D'Agostino. *Iron Age,* v. 175, June 9, 1955, p. 75-77.

All mechanical movements are powered from a single integrated chain drive. The drive is self-compensating in that the timing function will not be affected by the normal wear of its components. Photographs, diagrams. (L17, Cr)

453-L. Corrosion Resistant Alloys Play Key Part in Pickling. *Iron Age,* v. 176, July 7, 1955, p. 94-96.

Use of corrosion resistant alloys in pumps, valves and other equipment assures continued high-speed operation with minimum maintenance. Table, photographs. (L12, SG-g)

454-L. Are Pure Oxides the Answer to High Temperature Problems? *Iron Age,* v. 176, July 7, 1955, p. 104-105.

Pure oxide coatings resistant to temperatures above 3000° F. and erosion at supersonic speeds offer new means of protecting metals in rocket and jet engine parts. Photographs, tables. (L27, Al, AY)

455-L. Metal Finishing—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2G-16G.

Past, present, and possible future trends in electroplating, cleaning, phosphating and porcelain enamels. Photographs. (L12, L14, L17, L27)

456-L. More Production Through Chemical Maintenance. A. David Nesbitt. *Iron and Steel Engineer,* v. 32, June 1955, p. 104-112; disc., p. 112-115.

Chemical cleaning of piping, open-hearth checkers and checkerwork in blast furnace stoves. Photographs, tables, graphs, diagram. 15 ref. (L12, D1)

457-L. Tests on the Relative Efficiency of Chromate Pigments in Anticorrosive Primers. H. G. Cole. *Journal of Applied Chemistry,* v. 5, May 1955, p. 197-208.

Sea-water-spray corrosion tests made on two magnesium alloys, an aluminum alloy and mild steel, painted with primers made from 17 pigments, showed best protection by strontium chromate and poorest results from three complex cadmium, three lead chromiums, and barium chromate. Tables. 14 ref. (L26, Mg, Al, CN)

458-L. Nylon-Coated Metal Parts for Wear Resistance. Louis L. Stott. *Materials & Methods,* v. 41, June 1955, p. 92-94.

Coating process makes it possible to combine the good frictional characteristics of nylon with the better dimensional stability of metals. Photographs, graph. (L26)

459-L. Finishing Aluminium. G. E. Gardam and G. L. Jones. *Metal Industry,* v. 86, June 3, 1955, p. 476-479.

Review of well-established and more recent metal finishing methods for aluminum. Photographs. 26 ref. (L17, L19, L14, Al)

460-L. Electrodeposition of Rhodium. Edward A. Parker. *Plating,* v. 42, July 1955, p. 882-892.

Methods of purification and applications which depend on decorative white finish, hardness, corrosion resistance, optical reflectivity, low electrical resistance and combinations. Tables, diagrams. 13 ref. (L17, Rh)

461-L. Cleanability and Oil Spreading Rates. Henry B. Linford and Paul E. Grubb. *Plating,* v. 42, July 1955, p. 895-902.

Development of a correlation between the spreading rate of various oils, fats and greases, which are solid at room temperature, on a particular metal with the cleanability or difficulty of cleaning that soil from another metal. Tables, graphs, diagrams. 3 ref. (L12)

462-L. pH for the Electroplater. J. B. Mohler. *Products Finishing,* v. 19, July 1955, p. 32 + 8 pages.

Importance of pH determination in terms of its effect upon chemical balance, decomposition, bath control and plating quality. Table, graph. (L17)

463-L. Pickling at Half the Cost. George S. Shephard. *Steel,* v. 137, July 4, 1955, p. 76, 79.

Pickling line installed at Pittsburgh Screw and Bolt Corp. cut pickling costs in half, increased production and upgraded product quality. Photographs. (L12)

464-L. Reactive Sputtering and Associated Plant Design. L. Holland and G. Siddall. *Vacuum,* v. 3, July 1953, p. 245-253.

Advantages, gas-metal reactions and plant design. Desirable performance features of a plant enumerated. Diagram, graph. 19 ref. (L25)

465-L. Hot Dip Galvanizing Is a Science. V. Wallace G. Imhoff. *Wire and Wire Products,* v. 30, June 1955, p. 681-683, 726-727.

Experiment to ascertain relation between drawing time of the article galvanized and weight of the zinc deposited as galvanized coating. Tables, graphs. (L16, Zn)

466-L. Hardness of Hard Chromium Plates. H. Arend. *Henry Brutcher Translation No.* 3427, 10 p. (Abridged from *Metalloberfläche,* v. 3, no. 5, 1951, p. 72B-76B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 462-L, 1951. (L17, Cr)

467-L. Vaporization of Metals and Metalloids in Vacuum. H. Laporte. *Henry Brutcher Translation No.* 3439, 8 p. (From *Chemische Technik,* v. 5, no. 11, 1953, p. 632-634.) Henry Brutcher, Altadena, Calif.

Data on melting point, boiling point, vapor pressure, volume change on fusion, pressure coefficients of melting point and corresponding temperatures of a number of metals and metalloids. Tables. 3 ref. (L25, C25, P12)

468-L. Selection of the Most Favorable Conditions for Porous Chromium Plating. G. K. Shvyryaev and M. A. Shluger. *Henry Brutcher Translation No.* 3482, 9 p. (Condensed from *Vestnik Mashinostroeniya,* v. 34, no. 5, 1954, p. 64-68.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 733-L, 1954. (L17, Cr, ST)

469-L. On the Adhesion of Nickel-Chromium Electrodeposits. A. von Krusenstjern. *Henry Brutcher Translation No.* 3489, 3 p. (From *Metalloberfläche,* v. 5, no. 10, 1953, p. 153B-154B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 735-L, 1953. (L17, Cr, Ni)

470-L. The 'D' Chromium Plating Process. A. Kutzelnigg. *Henry Brutcher Translation No.* 3491, 7 p. (Abridged from *Metalloberfläche,* v. 5, no. 10, 1953, p. 156B-160B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 736-L, 1953. (L17, Cr)

471-L. Study of the Effect of High-Frequency Alternating Current on the Electrodeposition of Chromium. R. Bilfinger. *Henry Brutcher Translation No.* 3492, 10 p. (From *Archiv für Metallkunde,* v. 2, no. 4, 1948, p. 131-135.) Henry Brutcher, Altadena, Calif.

Effect of current density upon current efficiency and throwing power of chromium plating baths containing various quantities of foreign acid, in the presence and absence of high-frequency alternating current. Micrographs, tables, photographs, circuit diagram. (L17, Cr)

472-L. Investigation of Electrobrightening of Metals. P. V. Shchigolev and N. D. Tomashov. *Henry Brutcher Translation No.* 3502, 7 p. (Condensed from *Doklady Akademii Nauk SSSR,* v. 100, no. 2, 1955, p. 327-330.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 249-L, 1955. (L13, Cu, Ni, Zn)

473-L. Causes of Defects in Phosphate Coatings. E. Wagner. *Henry Brutcher Translation No.* 3507, 7 p. (Abridged from *Mitteilungen Forschungs - Gesellschaft Blechverarbeitung,* 1954, no. 7, p. 79-82.) Henry Brutcher, Altadena, Calif.

Possible faults in the various stages of activated hot phasphating, using zinc phosphate solutions, and hints for avoiding them. (L14)

474-L. (Czech.) Use of Basalt Jets for Pneumatic Drum Fettling Machines. Otakar Micanik. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 133-135.

Jets stand 20 times more than cast iron jets during uninterrupted operation; output of machines has increased because formerly it was necessary to exchange cast iron jets every 3 hr. Diagrams, table. 3 ref. (L10)

475-L. (French.) Strengthening of the Oxide Film on Tin to Improve Corrosion Resistance. S. C. Britton. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 134-138.

Addition of alloy elements to the metal; chemical and electrochemical treatment of the surface; treatment of tin in a film-forming solution. (L14, Sn)

476-L. (French.) Contribution to the Study of Electrolysis in Very Concentrated Solution. Example of Electrolytic Polishing. Philippe Brouillet. *Métaux, Corrosion-Industries,* v. 30, no. 356, Apr. 1955, p. 141-154.

Phenomena at the electrodes during electrolysis based on existence of a layer of adsorbed ions at the surface of the metal. Diagrams, tables. 34 ref. (To be continued.) (L13)

477-L. (German.) Several Processes for Determining the Quality of Eloxation Films. F. Baumann and R. Lattey. *Aluminium,* v. 31, no. 5, May 1955, p. 199-204.

Methods of measuring thickness, corrosion and wear resistance, porosity and electrical properties of anodic coatings on aluminum. Photographs, tables, graphs. 14 ref. (L19, Al)

478-L. (German.) Present Status of Mechanical Surface Treatment. H. H. Finkelnburg. *Metall,* v. 9, nos. 11-12, June 1955, p. 466-471.

Review of cutting and noncutting methods of changing or improving the surfaces of metals. Micrographs, table, diagrams, photographs. 4 ref. (L10)

479-L. (German.) Innovations in the Practice of Grinding and Polishing. W. Burkart. *Metall,* v. 9, nos. 11-12, June 1955, p. 472-473.

New polishing methods and materials. Micrographs. (L10)

480-L. (German.) Modern Surface Treatment in Automobile Manufacturing. M. Eitel. *Metall,* v. 9, nos. 11-12, June 1955, p. 474-478.

Methods of shaping, cleaning and coating automotive parts by mechanical, chemical and thermal means. 7 ref. (L general)

481-L. (German.) The Surface Treatment in the Electric Industry, With Special Consideration of the Telecommunications Industry. K. Leich. *Metall,* v. 9, nos. 11-12, June 1955, p. 478-482.

Functions of coating metals with nickel, zinc, cadmium, copper, chlorine, tin, aluminum, noble metals, and inorganic and organic nonmetallic substances, metal coatings on nonconductors, and various noncoat-forming surface treatments. 34 ref. (L general, T1)

482-L. (German.) Degreasing Metal Parts With Solvent Vapor. A. Arnold. *Metall,* v. 9, nos. 11-12, June 1955, p. 483-486.

Description and evaluation of different methods of removing films of oil and fat with vaporized solvents. (L12)

483-L. (German.) Modern Metal Spraying for Rust Protection in Austria. H. Reininger and R. Rengshausen. *Metall,* v. 9, nos. 11-12, June 1955, p. 487-488.

Evaluation of sprayed zinc and aluminum coatings. Photographs. 12 ref. (L23, Al, Zn)

484-L. (German.) Corrosion Protection by Cold Zinc Coating. I. C. Fritz. *Metall,* v. 9, nos. 11-12, June 1955, p. 488-489.

Evaluation of protective effect and properties of zinc-dust paint and zinc-paste coatings. Photographs. 6 ref. (L26, Zn)

485-L. (German.) Modern Processes of Producing Tin-Plated Sheet Metal. B. Keysselitz. *Metall,* v. 9, nos. 11-12, June 1955, p. 490-491.

Methods and equipment of tinplating sheet iron in "Ferrostan", halogen and alkaline baths. Diagrams, photographs. (L17, Sn)

486-L. (German.) Limitations in the Use of Flame Spraying. Hans von Hofe. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 180-188.

Principle of metal spraying and its proper uses as a protection against rusting, corrosion and scaling, for applying decorative and wear resistant coatings and bearing metals, for forming molds, and for the application of electrically conducting films and screens in the electrical and electronic industry. Photographs, graphs, table. 4 ref. (L23)

487-L. (German.) Zinc-Coating Plants for Tubes. Josef Leutbecher. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 777-779.

Details of operation, mechanical equipment with a view to most economical production, output of the plant, and other characteristic data. Diagrams, photographs. (L16, Zn)

488-L. (Russian.) Problem of the Choice of the Optimum Smoothness of Finish of Friction Surfaces. M. A.

Ryzhik. *Avtomobil'naia promyshlennost,* 1955, no. 5, May, p. 20-22.

Polishing and grinding prescriptions established in connection with dimensions and rotations of parts; wear tests. Photographs. 4 ref. (L10, Q9, S15)

489-L. (Russian.) **Effect of Electropolishing on the Physicochemical Properties of Pure Aluminum Surfaces.** P. V. Shchigolev. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 682-684 + 1 plate.

Coefficient of light reflection and the electrical resistance of the surface of electrolytically polished aluminum. Electronographic and X-ray studies of the oxide layer structure on electropolished aluminum, and comparisons made with mechanical processes. Graphs, micrographs. 3 ref. (L13, Al)

490-L. (Pamphlet.) **A Study of the Effect of Chromic Acid; and Chromic-Phosphoric Acid Rinse Solutions Upon Subsequently Applied Paint Coatings.** 23 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

Salt spray, water immersion, and outdoor exposure tests, conducted to determine the best treatment for ordnance equipment, indicate that good protection against corrosion and paint flaking can be secured by rinsing the previously phosphated surfaces with high-strength solutions of chromic and chromic-phosphoric acid. Details of solutions, methods of application, and results obtained are outlined. (L26)

491-L. (Book.) **Vapor-Plating.** C. F. Powell, I. E. Campbell, and B. W. Gonser. Electrochemical Society Series. 158 p. 1955. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $5.50.

With emphasis on the chemical process involved, rather than the physical, a unified picture is presented of the principles, techniques, and conditions required for the deposition of pure metals, carbides, nitrides, borides, silicides, and oxides from gaseous mixtures of their vaporized compounds. Summarizing the properties of the resulting coatings and materials, new applications for the process are suggested. (L25)

M

Metallography, Constitution and Primary Structures

196-M. The Crystal Structures of RhTe and $RhTe_2$. S. Geller. *American Chemical Society, Journal,* v. 77, May 5, 1955, p. 2641-2644.

Structures determined from X-ray powder diffraction data. Tables. 11 ref. (M26, Rh, Te)

197-M. The Distribution of Dislocations in Linear Arrays. A. K. Head and N. Louat. *Australian Journal of Physics,* v. 8, Mar. 1955, p. 1-7.

An approximate method for finding equilibrium distribution of arrays of dislocations. Analysis based on the assumption that an array of discrete dislocations may be replaced by a continuous distribution of smeared dislocations. (M26)

198-M. (French.) **On the Detection of the Polygonization by the Diffraction of X-Rays.** A. R. Weill. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 294-306.

X-ray methods for recognizing the polygonization of metals and alloys, either induced at the laboratory or spontaneously formed during industrial processing. Photographs. 20 ref. (M22)

199-M. (Polish.) **Electrolytic Polishing of Large Metallographic Specimens.** J. Ogerman. *Hutnik,* v. 22, no. 3, Mar. 1955; *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 6, no. 3, 1955, p. 9-10.

Specimens of steels of 6 to 15 sq. c.m. area were polished with consideration given to temperature, current density and polishing time; comparison of electrolytic and mechanical polishing. Micrographs, table. (M21, ST)

200-M. (Russian.) **Effect of Treatment on Bond Strengths in Crystals of an α-Solid Solution of an Iron-Nickel Alloy.** V. K. Kritskaia, G. V. Kurdiumov and L. V. Tikhonov. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 271-274.

Effect of heat treatment (quenching and tempering) and of plastic deformation; X-ray study of filings; character of distribution and redistribution of atoms, bond strength in the lattices. Graph, table. 14 ref. (M26, Q24, J general, Fe, Ni)

201-M. (Russian.) **Study of Some Cases of Block Formation in Aluminum and the Role of Impurities in the Delineability of the Blocks.** I. E. Bolotov, Iu. D. Kozmanov and A. N. Timofeev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 887-896.

Study of the polygonization of distorted single crystals and of the mosaic structure of single crystals that have undergone thermal fatigue. Micrographs. 15 ref. (M26, Q24, Al)

202-M. X-Ray Diffraction and Spectrographic Analysis. Ursula M. Martius. *Canadian Metals,* v. 18, June 1955, p. 22, 24, 26.

Principle features of X-ray diffraction and spectroscopy; practical problems which may be solved by means of these techniques. Photograph, graph. (M22, S11)

203-M. Metallurgy and Microradiography. I. Theory. R. Urlocker, J. W. Rutter, and W. C. Winegard. *Canadian Metals,* v. 18, June 1955, p. 28, 30, 32.

Microradiography supplements the investigation procedures of microporosity; presence and identification of inclusions; distribution, shape and particle size of a second phase; concentration gradients which may exist in certain regions. Diagram, photograph, micrographs. 5 ref. (M23)

204-M Thermionic Emission Microscopy of Metals. I. General. R. D. Heidenreich. *Journal of Applied Physics,* v. 26, June 1955, p. 757-765.

An electrostatic emission microscope operating with an accelerating voltage of 10-25 kilovolt described; factors determining image quality, particularly contrast and resolution; interpretation of images on the basis of the Schottky emission equation. Diagrams, tables, micrographs. 15 ref. (M21)

205-M. Intermediate Phases in the Cr-Mo-Co System at 1300° C. J. B. Darby, Jr., and P. A. Beck. *Journal of Metals, v. 7; American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, June 1955, p. 765-766.

Study of the Cr-Mo-Co ternary system and some notes on the new ternary phase, D, of unkown and apparently complex crystal structure. Diagrams, table. 2 ref. (M24, M26, Cr, Co, Mo)

206-M. A High-Temperature, X-Ray Diffraction, Powder Camera. E. Matuyama. *Journal of Scientific Instruments,* v. 32, June 1955, p. 229-231.

High-temperature Debye-Scherrer camera fitted with a small carbon-tube furnace is capable of attaining temperatures as high as 1800° C. Diagrams, graph. 5 ref. (M22)

207-M. Technique of Microautoradiography for Metal Specimens. Robert C. Plumb. *Review of Scientific Instruments,* v. 26, May 1955, p. 489-493.

It is capable of producing a resolution of at least nine microns with X-radiation and supplying quantitative information as to the distribution of radio-active material in a metallurgical structure. Diagrams, micrographs. 11 ref. (M23)

208-M. Electronic Vacuum Dilatometer. M. E. Dooley and D. F. Atkins. *Review of Scientific Instruments,* v. 26, June 1955, p. 568-571.

Apparatus and advantages. Several curves illustrate performance of the instrument. Diagrams, graphs. 5 ref. (M23)

209-M. Dislocations in Metals. Frank B. Cuff, Jr., and L. McD. Schetky. *Scientific American,* v. 193, July 1955, p. 80-87.

Many important properties of metals are now understood to result from a kind of imperfection in crystal lattices that is called a dislocation. A large group of properties which previously could be studied only in an empirical way are now being rationally analyzed. Photographs, diagrams. (M26)

210-M. Nature of Hexagonal Chromium and the Structure of Electrodeposited Chromium. S. A. Nemnonov. *Henry Brutcher Translation No.* 3493, 13 p. (Abridged from *Zhurnal Tekhnicheskoi Fiziki,* v. 18, no. 2, 1948, p. 239-246.) Henry Brutcher, Altadena, Calif.

Stages of formation of cubic chromium under ordinary conditions of deposition; effect of temperature and current density. 26 ref. (M27, L17, Cr)

211-M. The Sigma Phase in 18-8 Austenitic Steel Welds. B. I. Medovar and A. A. Rossoshinskii. *Henry Brutcher Translation No.* 3516, 16 p. (Abridged from *Avtomaticheskaya Svarka,* v. 7, no. 3, 1954, p. 26-40.) Henry Brutcher, Altadena, Calif.

Conditions for formation and methods of rendering visible brittle structural constituents, known as the sigma phase, in automatic welds made with chromium-nickel austenitic steel filler metal. Tables, graphs, photograph, micrographs. 17 ref. (M27, K1, SS)

212-M. (Czech.) **Electron Diffraction Method and Its Use in Metallography, Especially in the Metallography of Steel.** Frantisek Kralik. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 262-266.

Method used to study the structure of fracture surfaces and structural changes during secondary steel hardening. Micrographs. 10 ref. (M22, ST)

213-M. (French.) **Prohibited and Permitted Bands in Impure Semiconductors and Disordered Alloys.** J. des Cloizeaux. *Journal de physique et le radium,* v. 16, no. 4, Apr. 1955, p. 320-324.

Limits of permitted energy bands in a unidimensional semiconductor model or model of a disordered alloy, the latter representing a problematical succession of two types of cells. Graph, diagrams. 7 ref. (M26)

214-M. (French.) **Iron Content and Size of Grains in an Annealed Zinc Alloy With 0.3% Pb and 0.3% Cd.**

L. Boschi, H. Destaillats, J. Sabato, J. Walls and A. Varsavski. *Métaux, Corrosion-Industries*, v. 30, no. 355, Mar. 1955, p. 105-107.

Influence of iron impurity on grain size; new technique for measuring grain size without using polarized light. Tables, graph, micrographs. 6 ref. (M27, Zn)

215-M. (Pamphlet.) **High-Resolution Autoradiography for Study of Grain Boundaries in Metals.** PB 111558. 82 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $2.25.

Metallurgical phenomena studied include diffusion, gases in metals, effect of heat treatment on mode of distribution of a minute phase, and the modifying effects of trace quantities of an element on the formation of a second constituent. (M23, M27)

216-M. (Book.) **Neutron Diffraction.** G. E. Bacon. Monographs on the Physics and Chemistry of Materials. 299 p. 1955. Oxford University Press, Amen House, London E.C. 4, England. 35s.

Experimental techniques. Investigations of magnetic materials and alloys. (M22, SG-p)

N

Transformations and Resulting Structures

251-N. The Effects of Oxygen and Nitrogen in Solid Iron and Steel. L. C. Bogan. *Australasian Engineer*, 1955, Apr., p. 59-65.

Nitrogen activity in alpha and gamma iron aids in understanding phenomena associated with plastic flow; in steels, oxygen provides information on the effects of nonmetallic inclusions. The solid-solution effects of both gases can be effectively suppressed by aluminum, titanium or zirconium, fixing them as compounds which have a low solubility in alpha iron. Micrographs, tables, graphs. 22 ref. (N12, CI, ST)

252-N. The Topography of Solid-Liquid Interfaces of Metal Crystals Growing From the Melt. C. Elbaum and B. Chalmers. *Canadian Journal of Physics*, v. 33, May 1955, p. 196-208.

Technique developed for separating, during crystal growth, the liquid from the adjacent solid. Diagrams, micrographs. 6 ref. (N12, Pb)

253-N. Atomic Interaction in Molten Alloy Steels. John Chipman. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 97-106.

Interactions between two or more dissolved elements in liquid iron examined through the effect of one on the activity coefficient of the other. Table, graphs. 40 ref. (N14, P12, ST)

254-N. The Strain Ageing of Alpha-Iron. W. R. Thomas and G. M. Leak. *Iron and Steel Institute, Journal*, v. 180, June 1955, p. 155-161.

Rates of strain aging on specimens containing only nitrogen and on those containing only carbon. Table, graphs. 16 ref. (N7, M26, Q24, Fe)

255-N. Considerations in the Evaluation of Graphitization in Piping Systems. Helmut Thielsch, E. M. Phillips, and E. R. Jerome, Jr. *Welding Journal*, v. 34, June 1955, p. 286S-294S.

Laboratory investigations of graphitized piping, sampling, bend and impact testing, and metallographic grading; interpretation of test results; number of specimens required; effects of heat treatments. Photographs, diagrams, graphs, tables, micrographs. 3 ref. (N8)

256-N. (English.) **An Electro-Acoustical Study on Cold-Working and Recrystallization of Aluminium.** F. Gatto. *Nuovo cimento (Supplemento)*, v. 1, ser. 10, no. 2, 1955, p. 124-125.

Measurement of elastic constants can be applied to studying the phenomena connected with cold working and recrystallization of metals. Graphs. (N5, Q24, Al)

257-N. (English.) **Transport Phenomena in Melts and the Mechanism of Melting.** A. R. Ubbelohde. *Nuovo cimento (Supplemento)*, v. 1, ser. 10, no. 2, 1955, p. 126-138; disc., p. 138-139.

Transport phenomena, in particular the viscosity of the melts near the freezing point, and some significant facts about the thermodynamic parameters of melting. Graphs, tables. 17 ref. (N14)

258-N. (English.) **Self-Diffusion in Liquid Metals.** G. Careri and A. Paoletti. *Nuovo cimento (Supplemento)*, v. 1, ser. 10, no. 2, 1955, p. 161-164; disc., p. 164-165.

Brief report on some measurements of the self-diffusion coefficient on the basis of theories of the liquid state. Tables. (N1, Sn, Pb, In)

259-N. (Russian.) **Study of Diffusion Throughout the Grain and Along Grain Boundaries, Using the Method of Autoradiography.** S. Z. Bokshtein, S. T. Kishkin, L. M. Moroz and T. I. Gudkova. *Doklady Akademii Nauk SSSR*, v. 102, no. 1, May 1, 1955, p. 73-75 + 1 plate.

Relation of density of darkening to depth of lead diffusion in nickel and iron; comparison of rate of diffusion in crystals and along boundaries; difference in mutual solubility of the metals. X-rays, graphs. 8 ref. (N1, N12, Pb, Fe, Ni)

260-N. (Russian.) **Determination of the Coefficients of Diffusion on the Basis of the β-Radiation Absorption.** A. A. Zhukhovitskii and V. A. Geodakian. *Doklady Akademii Nauk SSSR*, v. 102, no. 2, May 11, 1955, p. 301-304.

Includes graphs. 6 ref. (N1)

261-N. (Russian.) **Methods of Growing Monocrystals of Metals With a Given Spatial Orientation and With Natural Crystallographic Faces.** D. M. Chigvinadze. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 5, May 1955, p. 805-811.

Bridgman's and other methods for obtaining monocrystals of zinc and its alloys, including descriptions of apparatuses, heating temperatures, etc. Microstructure of natural crystallographic faces. Diagrams, micrographs. 10 ref. (N12, M27, Zn)

262-N. (Russian.) **Third Transformation During the Tempering of Steel.** V. G. Permiakov. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 5, May 1955, p. 908-915.

Carbide reactions involved in the third transformation during tempering; heating temperature at which intermediate carbide passes into cementite; dilatometric and magnetometric curves. Diagram, graphs, table. 16 ref. (N8, J29, ST, CN)

263-N. (Russian.) **Linear Rate of Crystallization of Metals.** B. M. Maslennikov. *Zhurnal Tekhnicheskoi Fiziki*, v. 25, no. 5, May 1955, p. 933-938.

Solution of thermal conductivity problem and the experimental verification of this solution. Tables, graph. 13 ref. (N12, P11, Pb, Sn, Zn)

264-N. (Swedish.) **The Decomposition of Martensite in Iron-Carbon Alloys.** Gunnar Folke and Erik Nygren. *Jernkontorets Annaler*, v. 139, no. 4, 1955, p. 250-264.

Decomposition in high purity iron-carbon alloys ranging from 0.15 to 1.42% carbon and in a carbon steel studied by X-ray diffraction methods. Tables, graphs. 27 ref. (N8, Fe)

265-N. Effect of Reactor Irradiation on the White-to-Grey Tin Transformation. Jerome Fleeman and G. J. Dienes. *Journal of Applied Physics*, v. 26, June 1955, p. 652-654.

Effect of low-temperature (liquid nitrogen) reactor irradiation. The transformation, measured by dilatometry, is drastically accelerated. Graph, table. (N6, Sn)

266-N. Solid State Diffusion in the Reduction of Magnetite. J. O. Edstrom and G. Bitsianes. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, June 1955, p. 760-765.

Parabolic rate constants are determined for the formation of wüstite by the solid state reaction between magnetite and iron. Reaction was diffusion controlled and inert marker studies indicated that the mass transport through the wüstite layer was accomplished by means of iron migration. Diagram, graphs, micrographs, table. 19 ref. (N1, D general, Fe)

267-N. Diffusion in Liquid-Bismuth Alloys. R. E. Grace and G. Derge. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, July 1955, p. 839-842.

Diffusivity measured by the capillary reservoir method as a function of temperature and composition. Tables, diagrams, graphs. 13 ref. (N1, Pb, Bi)

268-N. Principles and Applications of Step Quenching (Martempering). Richard F. Harvey. *Metal Treating*, v. 6, May-June 1955, p. 6-8, 10-11.

Structural effects of interrupted quenching; isothermal transformations; mechanical working effects. Diagrams, graphs, table. (N8, J26, AY)

269-N. Accelerated Graphitization of White Cast Iron With Increased Chromium Content. M. A. Krishtal. *Henry Brutcher Translation No.* 3446, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 98, no. 4, 1954, p. 583-584.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 25-N, 1955. (N8, CI)

270-N. Usefulness of Continuous-Cooling TTT Diagrams for Special Problems With High-Strength Weldable Steels. F. Nehl and A. Rose. *Henry Brutcher Translation No.* 3476, 22 p. (From *Stahl und Eisen*, v. 74, 1954, p. 1054-1062.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 382-N, 1954. (N8, K general, Q25, AY)

271-N. Effect of Cyclic Stressing Upon Diffusion in Plain Carbon Steels. H. Schenck and E. Schmidtmann. *Henry Brutcher Translation No.* 3500, 9 p. (Part from *Archiv für das Eisenhüttenwesen*, v. 25, nos. 11-12, 1954, p. 579-583.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 107-N, 1955. (N1, N7, CN)

272-N. Some Fundamental Considerations Regarding the Transformations of Austenite in the Pearlite and Bainite Ranges. W. Jellinghaus and E. Houdremont. *Henry Brutcher Translation No.* 3510, 23 p. (Abridged from *Stahl und Eisen*, v. 25, nos. 5-6,

1954, p. 263-270.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 321-N, 1954. (N8, AY)

273-N. Diffusion of Arsenic in Steel. D. S. Kazarnovskii. *Henry Brutcher Translation No.* 3518, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 100, no. 6, 1955, p. 1073-1075.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 207-N, 1955. (N1, M27, ST, As)

274-N. (German.) Investigation of the Tendency of Soft Unalloyed Steels to Age by Hardness Testing at Temperatures Up to 300° C. Eduard Houdremont, Wolfgang Wepner and Hans-Joachim Wiester. *Archiv für das Eisenhüttensen*, v. 26, no. 5, May 1955, p. 279-295.

Effect of aging temperature, type of steel, nitrogen and carbon content, insoluble nitrides, hot working, and heat treatment on the susceptibility of steel to age hardening. Diagrams, tables, graphs. 4 ref. (N7, Q29, CN)

275-N. (German.) Microscopic Evidence of Carbide From Supersaturated Alpha Irons. Hugo Josef Seemann and Ursula Hintzpeter. *Archiv fur das Eisenhüttenwesen*, v. 26, no. 5, May 1955, p. 287-289.

Effect of artificial aging time on the structures and hardnesses of two irons with 0.02 and 0.13% carbon content. Graph, micrographs. 7 ref. (N7, Q29, CN)

276-N. (German.) Effect of Elastic Stresses on Martensite Formation. Albert Kochendörfer and Hans-Günter Müller. *Archiv für das Eisenhüttenwesen*, v. 26, no. 5, May 1955, p. 291-298.

Preparation of monocrystals of iron-nickel steel; effect of quenching and elastic tensile and shear stresses on martensite orientation. Diagrams, micrographs, photographs. 21 ref. (N8, AY)

277-N. (German.) Atomistic Considerations of the Effect of Alloying Elements on the Polymorphism of Iron. Konrad Schubert. *Archiv für das Eisenhüttenwesen*, v. 26, no. 5, May 1955, p. 299-305; disc., p. 305-306.

Effect of alloying element on the transformation of iron and on the stability of the structures of martensitic iron alloys explained by position of the element in the periodic system and its outer-shell configuration. Table, graphs, diagrams. 36 ref. (N6, Fe)

278-N. (Pamphlet.) Diffusion of Iron, Nickel and Cobalt Into Hot-Pressed Titanium Carbide. PB 111612. 32 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00.

Calculation of the diffusion coefficients is made both by the surface decrease method and by the determination of the concentration gradient within the sample. (N1, Ti, Fe, Ni, Co)

279-N. (Pamphlet.) Minutes of Titanium Symposium on Diffusion and Mechanical Behavior. PB 111567. 59 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

Papers and discussion on the diffusion of hydrogen, nitrogen, and oxygen, volume diffusion of carbon, the effect of hydrogen on the ultrasonic attenuation in titanium, the effect of temperature on slip and twinning in titanium, plasticity of beta titanium. (N1, Q general, Ti)

NATIONAL METAL CONGRESS
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P
Physical Properties and Test Methods

207-P. Ferromagnetic Domain Patterns on Single Crystals and Bicrystals of Nickel. Ursula M. Martius and K. V. Gow. *Canadian Journal of Physics*, v. 33, May 1955, p. 225-234.

Investigation of the effect of crystal boundaries on domain structure. Diagram, table, micrographs. 13 ref. (P16, Ni)

208-P. Reaction of Nitrogen With Uranium. M. W. Mallett and A. F. Gerds. *Electrochemical Society, Journal*, v. 102, June 1955, p. 292-296.

Rates of reaction determined by volumetric measurements in the temperature range 550 to 900° C. at atmospheric pressure. Reactions found to follow a parabolic rate law with some deviations initially and also after the period of parabolic reaction. Micrographs, graphs, table. 4 ref. (P13, U)

209-P. Kinetics of Surface Reactions of Metals. I. Iron. Donald M. Sowards and Norman Hackerman. *Electrochemical Society, Journal*, v. 102, June 1955, p. 297-303.

Reaction of iron with dilute, aqueous acetic acid studied in a closed system with a nitrogen atmosphere at 34° C. Extent of reaction, determined gravimetrically, found to be directly proportional to exposure time. Diagrams, graphs, tables. 24 ref. (P13, R6, Fe)

210-P. Low-Expansion Cast Iron. Harold Brown. *Machine Design*, v. 27, June 1955, p. 175-177.

Properties and design characteristics of a nickel cast iron capable of holding precision dimensions under local heating conditions. Photograph, graph, micrograph, table. (P11, CI)

211-P. Electrical Resistance of Copper-Gold Alloys at Low Temperatures. Elio Passaglia and William F. Love. *Physical Review*, v. 98, ser. 2, May 15, 1955, p. 1006-1010.

Electrical resistance of a series of five alloys in quenched and annealed states studied from room temperature to about 2° K. Composition of the alloys was 25, 37.5, 50, 62.5 and 75 At.% gold. Graphs, tables. 7 ref. (P15, Cu, Au)

212-P. Hysteresis of the Angle of Contact of Mercury Against Steel. D. J. Wright. *Physical Society, Proceedings*, v. 68, no. 425B, May 1955, p. 297-303.

Problems undertaken to investigate how the hysteresis of the angle of contact varied with adsorption from the atmosphere in which the solid was placed, and to attempt some qualitative experiments on the effects of roughness. Diagram, graph, tables. 16 ref. (P13, ST, Hg)

213-P. Electron Emission and Other Phenomena on Freshly Disturbed Surfaces. L. Grunberg. *Research*, v. 8, June 1955, p. 210-214.

Measurement of small electron currents from deformed surfaces. Study of abraded surfaces by their images on photographic plates. Diagrams. 13 ref. (P15, S15)

214-P. The Thermal Conductivity of Tin at Low Temperatures. S. J. Laredo. *Royal Society, Proceedings*, v. 229, ser. A. May 24, 1955, p. 473-492.

The use of subsidiary thermometers has improved the technique of measurement below 1° K. and enabled conductivities to be measured more accurately. Diagram, tables, graphs. 31 ref. (P11, Sn)

215-P. Non-Magnetic Ferrous and Magnetic-Compensating Alloys. C. Gordon Smith. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 171-178.

Properties and application of non-magnetic steels, cast irons, and magnetic compensating alloys. Graphs, tables. 9 ref. (P16, T1, ST, CI)

216-P. Soft Magnetic Materials. W. S. Melville. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 37-84.

Important characteristics and factors affecting their properties in limiting commercial applications. Tables, graphs, diagrams. 24 ref. (P16, T general, SG-p)

217-P. (English.) Theoretical Study of Residual Resistance of Binary Alloys Containing Foreign Atoms in Small Concentration. Hiroshi Fujiwara. *Physical Society of Japan, Journal*, v. 10, no. 5, May 1955, p. 339-346.

A modified, screened Coulomb field is exactly obtained from the Thomas-Fermi equation by numerical integration. For the calculation of the cross section, the method of partial wave was used. Graphs, tables. 7 ref. (P15)

218-P. (English.) Magnetic Properties of FeTe. Enji Uchida and Hisamoto Kondoh. *Physical Society of Japan, Journal*, v. 10, no. 5, May 1955, p. 357-362.

Susceptibility-temperature relation for the compound FeTe measured over a range of temperatures between liquid air and 1150° C. Graphs, table. 13 ref. (P16, Fe, Te)

219-P. (German.) Measuring the Direct-Current Magnetization Curve and Hysteresis Curve. Hans Neumann. *Archiv für technisches Messen*, 1955, no. 232, May, p. 105-108.

Practical suggestions on the determination of magnetic properties. Graphs. 14 ref. (P16)

220-P. (Italian.) Influence of Chromium and Manganese Impurities on Electric Properties of Aluminum. T. Federighi. *Alluminio*, v. 24, no. 2, Mar. 1955, p. 129-133.

Effect of small chromium and manganese contents on commercial aluminum in electrical applications. Graphs, tables. 3 ref. (P15, Al)

221-P. (Russian.) Effect of Order or Disorder on the Hall Effect in Ferromagnetic Alloys. N. S. Akulov and A. V. Cheremushkina. *Doklady Akademii Nauk SSSR*, v. 102, no. 1, May 1, 1955, p. 45-47.

General formula permits a quantitative determination of Hall's constant with respect to the resistivity of the alloy in relation to temperature and to the degree of order. Graphs. 9 ref. (P15, SG-p)

222-P. (Russian.) Interrelationship Between Composition, Temperature, and Heat Resistance. II. Alloys of a Ternary System of Nickel-Chromium-Titanium. I. I. Kornilov and V. V. Kosmodem'ianskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 2, Feb., p. 90-97.

Optimum compositions of the most heat resistant alloys determined for several ranges of temperatures. Problem of degree of homogeneity of structure. Graphs. 8 ref. (P12, Ni, SG-h)

223-P. (Russian.) Heat Content and Mechanical Properties of Metals. K. A. Osipov and S. G. Fedotov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 2, Feb., p. 98-104.

Relation of heat content of liquid metals at the melting point to the strength, hardness and plastic

properties of the solidified metals. Graphs, tables. 30 ref. (P12, Q general)

224-P. (Russian.) **Some Problems of a Slag Theory.** I. S. Kulikov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 113-121.

Activity of iron oxide in the system $FeO-SiO_2$ at temperatures from 1178 to 3000° C. Concentration dependence of partial heats and entropies of solution. Graphs, table. 9 ref. (P12, B21, Fe)

225-P. Energy Relations in Cold Working an Alloy at 78° K. and at Room Temperature. J. S. L. Leach, E. G. Loewen and M. B. Bever. *Journal of Applied Physics,* v. 26, June 1955, p. 728-731.

Energy relataions associated with plastic deformation by cold working of a 75% gold-25% silver alloy at two temperatures. The energy stored in the chips was measured by tin solution calorimetry and the total energy expended in the deformation was determined from dynamometer measurements. Diagrams, tables, graph. 10 ref. (P12, Q24, Au, Ag)

226-P. Work Function of Tungsten Single Crystal Planes Measured by the Field Emission Microscope. Erwin W. Müller. *Journal of Applied Physics,* v. 26, June 1955, p. 732-737.

Method combines the field emission microscope with a probe collector. The current density in the (011) plane turned out to be 4 to 5 orders of magnitude smaller than in strongly emitting planes. Diagrams, graphs, table, photograph. 21 ref. (P15, M26, W)

227-P. Heat Transfer Experiments With Sodium and Sodium Potassium Alloy. W. B. Hall and A. E. Jenkins. *Journal of Nuclear Energy,* v. 1, June 1955, p. 244-263.

Theoretical approach to the problem of heat transfer in liquid metals. Description of experiments in which the heat transfer coefficients between two annuli, each carrying a flow of liquid metal, were measured. Graphs, diagrams, table. (P11, Na, K)

228-P. Atomic Radiations Change Materials. C. Mannal, C. A. Bruch and R. F. Koenig. *Power,* v. 99, July 1955, p. 94 + 6 pages.

Design engineers planning nuclear reactors must deal with radiations as an additional factor to the more usual weight, strength, hardness, thermal conductivity and electrical resistivity considered in many machinery arrangements. Photographs, graphs, table, diagrams, micrographs. 5 ref. (P10)

229-P. Measurement of Resistance and Reactance of Expanded ACSR. Joel Tompkins, B. L. Jones and P. D. Tuttle. *Power Apparatus and Systems,* 1955, no. 18, June, p. 368-373; disc., p. 373-375.

Electrical characteristics, reactance and effective resistance at the frequency of 60 c.p.s., of steel reinforced aluminum cable. Tables, graphs, photographs, diagrams. 5 ref. (P15, Al, ST)

230-P. Vapor Pressure Curves for C, Ni, Fe, Cr, Mo, W, Cu, Ta, and Al Over the Pressure Range From 10^{-10} Atm. to 1 Atm. A. R. Smider. *U. S. Atomic Energy Commission,* CRD-T2B-171, 1952, 12 p.

Pressure range covered herein is considered to be adequate for all ordinary applications. Tables, graphs. (P12)

231-P. Thermal Conductivity of Metal Composites. E. B. Masters. *U. S. Atomic Energy Commission,* APEX-186, 1954, 4 p.

Results of tests performed to evaluate the thermal insulating properties of metal composites. Comparison of thermal conductivities of the metal composite tested and "Thermoflex" mineral wool insulation at various temperatures. Graph, diagrams. (P11)

232-P. (English.) **Investigation on the Electrical Resistance Alloys of Copper Manganese and Tin.** Hideo Nishimura and Masao Adachi. *Kyoto University, Engineering Research Institute Technical Reports,* v. 4, no. 3, Sept. 1954, p. 37-72.

Investigation of the electrical properties of the ternary copper alloys, containing 2-18% manganese and 4-10% tin, revealed that annealing at low temperature decreases the electrical resistance and increases the temperature coefficient of cold drawn specimens. Tables, diagrams, graphs, micrographs. 59 ref. (P15, SG-q, Cu)

233-P. (German.) **Thermodynamic Analysis. II. The Heat-Content Curve of a Substance From a Single Calorimetric Experiment.** Willy Oelsen, Karl Heinz Rieskamp and Olaf Oelsen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 253-266.

New simple calorimetric method for measuring heat contents of substances, especially of metals, over wide temperature ranges. Diagrams, graphs, table. 31 ref. (P12)

234-P. (Polish.) **Activity Coefficients of Metals in Liquid Ternary Solutions.** Wadysaw Ptak. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 69-87.

Formulas for several ternary liquid solutions, effect of temperature and composition on activity coefficients. Tables, phase diagrams. 3 ref. (P12, Pb, Cd, Zn, Sn, Bi)

235-P. (Book.) **Magnetic Alloys and Ferrites.** M. G. Say, editor. Electrical Engineering Progress Series. 200 p. 1954. George Newnes Limited, Tower House, Southampton Street, Strand, W. C. 2, London, England. $2.94.

Eight papers which present an account of modern views on the fundamental processes of magnetization, including the domain theory. Pertinent papers are individually abstracted. (P16, SG-n, SG-p)

Q

Mechanical Properties and Test Methods; Deformation

655-Q. A Metallurgical Evaluation of Iodide Chromium. D. J. Maykuth, W. D. Klopp, R. I. Jaffee and H. B. Goodwin. *Electrochemical Society, Journal,* v. 102, June 1955, p. 316-331.

Both the physical condition and the purity of chromium are important factors in its ductility. Small quantities of oxygen, nitrogen, iron, molybdenum, tungsten and silicon have little effect on the bend ductility of chromium. However, nickel, carbon or sulfur adversely affect both the hot and cold ductility. Tables, graphs, micrographs. 13 ref. (Q23, Cr)

656-Q. The Effect of Grinding on the Fatigue Strength of Steels. D. N. Cledwyn-Davies. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 2, 1955, p. 83-92.

Investigation to determine effects of cylindrical grinding on fatigue strength of a nickel-chromium-molybdenum alloy steel hardened and tempered to give a nominal ultimate stress of 80 tons per sq.in. or 62 tons per sq.in., and carbon steel at 45 or 27 tons per sq.in. Photographs, graphs, diagrams, tables. 9 ref. (Q7, G18, ST)

657-Q. How Important is Hydrogen Embrittlement? N. J. Grant and J. L. Lunsford. *Iron Age,* v. 175, June 2, 1955, p. 92-94.

Hydrogen absorption can permanently affect the ductility of cold worked steel. Micrograph, graphs. 1 ref. (Q23, ST)

658-Q. Reproducibility of Wöhler-Type Fatigue Tests. J. Clayton-Cave, R. J. Taylor and E. Ineson. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 161-169.

A study of the variabilities of fatigue test results obtained from individual testing machines, a battery of 12 testing machines of identical design, and a number of testing machines of similar design in different laboratories. Tables, diagrams, graphs. 9 ref. (Q7)

659-Q. Effects of Sliding Velocity and Temperature on Wear and Friction of Several Materials. R. L. Johnson, M. A. Swikert and E. E. Bisson. *Lubrication Engineering,* v. 11, May-June 1955, p. 164-170.

Materials, apparatus and procedures, results. Table, diagram, graphs. 17 ref. (Q9, Cu, Ni, Cl)

660-Q. A Practical Strain-Hardening Function. E. Voce. *Metallurgia,* v. 51, no. 307, May 1955, p. 219-226.

Relationship between stress and indentation hardness reviewed in the light of the exponential function, and the nature of the fillet connecting the strain hardening curve with the elastic line. Graphs, tables. 13 ref. (Q29)

661-Q. Structural Engineering Aspects. A. M. Freudenthal. Paper from "Building Materials—Their Elasticity and Inelasticity". Interscience Publishers. p. 64-121.

Implications of the rheological behavior of the principal engineering materials in terms of the performance of engineering structures. Diagrams, graphs, table. 9 ref. (Q24)

662-Q. Metals. P. Feltham and M. W. Thring. Paper from "Building Materials—Their Elasticity and Inelasticity". Interscience Publishers. p. 125-188.

Metals in building, heat treatment of steel, engineering and compression tests, shear and tensile stresses, elasticity, creep, fracture, brittle fracture and fatigue. Photographs, graphs, diagrams, tables. 93 ref. (Q general, T26, Cu, Fe, Pb, ST)

663-Q. (English.) **The Theory of Fatigue Fracture of Metals.** Takeo Yokobori. *Physical Society of Japan, Journal* v. 10, no. 5, May 1955, p. 368-374.

Fatigue cracks are assumed to form as a result of a large tensile stress caused by a piled-up group of dislocations, plus an externally applied tensile stress component, with the aid of other stress concentration factors associated with the obstacle or inclusion itself. Diagrams, graphs, table. 30 ref. (Q7)

664-Q. (English.) **Direct Tensile Tests on Standard Rolled Sections Made on Steel A-37.** F. Hebrant and L. Demol. *Acier, Stahl, Steel,* v. 20, no. 4, Apr. 1955, p. 173-177.

Comparison of the values of the elastic limit and of the ultimate strength, as obtained from tensile tests on standard test pieces, with the corresponding values measured by means of direct tensile tests on normal rolled steel sections. Photographs, graphs, diagrams, tables. (Q27, ST)

665-Q. (English.) **Tensile Tests on Riveted Connections of Rolled Sections Made of Steel A-37.** F. Hebrant and L. Demol. *Acier, Stahl, Steel,* v. 20, no. 4, Apr. 1955, p. 178-184.

Tests were concerned with end connections of standard rolled sections with gusset-plates, such as are met with in small and medium-sized structures. Photographs, graphs, diagrams, tables. 6 ref. (Q27, ST)

666-Q. (English.) **Tangential Modulus in Some Metals Near the Melting Point.** P. G. Bordoni and M. Nuovo. *Nuovo cimento (Supplemento),* v. 1, ser. 10, no. 2, 1955, p. 155-158; disc., p. 158.

Investigation of the elastic behavior of tin, lead and bismuth at high temperature. Graphs. 7 ref. (Q1, Q21, Sn, Pb, Bi)

66-Q. (French.) **A Study of the Microstructure of Plastic Deformation of Solid Solution Copper-Zinc With 65 to 66% Copper and Its Evolution During Annealing. Particular Case of Deformation by Abrasion.** Pierre A. Jacquet. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 307-325; disc., p. 325-326.

Changes during step annealing, up to final stage of typical polygonization, confirmed by X-rays. Micrographs, tables. 12 ref. (Q24, J23, M27, Cu, Zn)

668-Q. (German.) **The Chemical Composition of Gray Iron and Its Tensile Strength.** Paul A. Heller and Hans Jungbluth. *Giesserei,* v. 42, no. 10, May 12, 1955, p. 255-257.

Effect of wall thickness and degree of saturation on tensile strength. Graphs, tables. 15 ref. (Q23, CI)

669-Q. (German.) **The Behavior of Spherical Graphite in the Plastic Deformation of Ductile Cast Iron.** B. Sigg. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 148-150.

Study of the deformation of spheroid graphite in high silicon cast iron subjected to tensile and compression stresses. Micrographs, graph, table. (Q24, CI)

670-Q. (Italian.) **Initial Yielding Phenomena and Luder Lines in Drop Forging of Some Aluminum-Magnesium Alloys.** F. Sacchi and L. Mori. *Alluminio,* v. 24, no. 2, Mar. 1955, p. 121-127..

Appearance of Luder lines on fine-grained and annealed alloys and absence of the lines in coarse-grained and slightly hardened alloys. Photographs, graphs, diagrams. 3 ref. (Q24, F22, Al, Mg)

671-Q. (Polish.) **Heat Resistant Alloys and Their Properties.** E. Lachowski. *Technika lotnicza,* v. 10, no. 3, May-June 1955, p. 73-81.

Strength and anti-corrosion properties, required of alloys used in jet aircraft are given for chromium-nickel steels, and Nimonic and Vitallium alloys. Tables, graphs. (Q23, R general, SS, Cr, Ni, Co, Mo)

672-Q. (Russian.) **Theory of Small Elasto-Plastic Deformations of Anisotropic Media.** I. V. Gol'denblat. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 60-67.

Making use of the general tensor properties of fields of deformation and stresses, the author deduces basic equations for the theory of anisotropic media, relating these to the corresponding equations for the theory of isotropic media. Diagrams. 2 ref. (Q21, Q24)

673-Q. (Russian.) **Propagation of Disturbances in a Nonlinear-Elastic and Inelastic Medium.** Kh. A. Rakhmatulin and G. S. Shapiro. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 68-89.

Impact stressing causes elasto-plastic waves of deformation. Propagation of disturbances in a medium with a nonlinear relation between stress and deformation; in elasto-plastic media; and in elasto-viscous, viscous-plastic, and elasto-viscous-plastic media. At high pressures considerably above the yield point for shear and at high rates of deformation, solids behave like gases. Graphs, diagrams, photographs. 77 ref. (Q6, Q24, Q21)

674-Q. (Russian.) **Problem of Complex Stressing.** L. M. Kachanov. *Prikladnaia Matematika i Mekhanika,* v. 19, no. 3, May-June 1955, p. 371-375.

Theory of elasto-plastic deformations and that of plastic flow; equations for the two theories and their inter-relation. 5 ref. (Q24, Q21)

675-Q. (Russian.) **Nature of Necking During the Tensile Testing of Specimens.** N. N. Davidenkov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 877-880.

Necking during tension is viewed as a result, not of the change of the physical nature of the process of plastic deformation, but of the impairment of the mechanical stability of uniform elongation. Graph. 13 ref. (Q27)

676-Q. (Russian.) **Influence of Molten Metallic Coatings on the Mechanical Properties of Steels and Alloys.** Ia. M. Potak and I. M. Shcheglakov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 897-907.

Mechanical properties of the alloys determined at the melting temperature of the coating. Comparison of properties of plated and unplated metals at various temperatures. Tables. 4 ref. (Q general, L general, ST, AY)

677-Q. (Russian.) **Problem of the Nature of the Hardening and Softening of Plastically Deformed Metals. I.** V. N. Danilov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 916-921.

Relationship between hardening and the coefficient of thermo-electromotive force, and lattice distortion. Temperature of recrystallization determined by measuring the thermo-e.m.f. Graphs, table. 19 ref. (Q24, N5, ST, Cu, Fe, Al)

678-Q. (Russian.) **Character of the Fracturing of Plastic Metals Under the Conditions of the Concentration of Stresses During Tension.** Iu. I. Likhachev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 922-932.

Notched specimens tested to show relation of load to position of boundary between elastic and plastic zones; local plastic deformations; shear tests; tangential stresses. Diagrams, graphs. 8 ref. (Q26, Q23, ST)

679-Q. (Swedish.) **Influence of Annealing Treatments at About 650° C. After Work Hardening on Impact Properties of Soft Steels.** G. Sehlberg. *Jernkontorets Annaler,* v. 139, no. 4, 1955, p. 215-224.

Study of low-carbon steels subjected to cold working by stretching and subsequent cold working. Micrographs, graphs, tables. (Q6, Q24, CN)

680-Q. (Swedish.) **Deformation Phenomena and Aging Effects in Torsion Testing of Cold Drawn Low-Carbon Steel Wire.** Ake Josefsson. *Jernkontorets Annaler,* v. 139, no. 4, 1955, p. 225-249.

A rise in the nitrogen content from 0.003 to 0.006% results in a pronounced decrease in the number of turns to fracture, when a cold drawn low-carbon steel wire is twisted. Tables, graphs, micrographs. (Q1, N7, CN)

681-Q. An Investigation of Strain Aging in Fatigue. J. C. Levy and G. M. Sinclair. *American Society for Testing Materials, Preprint No.* 70, 1955, 22 p.

Application of strain-aging theory to account for a peak in fatigue life occurring at about 450° F. Graphs, photographs, micrographs, diagrams, tables. 34 ref. (Q7, N7, CN)

682-Q. Understressing as a Means of Eliminating the Damaging Effect of Fatigue Stressing. H. E. Frankel and J. A. Bennett. *American Society for Testing Materials, Preprint No.* 71, 1955, 9 p.

Rotating-beam tests of a heat treated alloy steel showed that the fatigue limit could be increased by coaxing. Damaging effect of fatigue stressing 10% above the fatigue limit was eliminated by understressing and coaxing. Tables, graphs. 9 ref. (Q7, AY)

683-Q. The Fatigue Properties of Some Titanium Alloys. A. W. Demmler, Jr., M. J. Sinnott and L. Thomassen. *American Society for Testing Materials, Preprint No.* 72, 1955, 13 p.

Rotating-beam fatigue life characteristics of three commercial titanium alloys: Ti-75A, RC-130B and RC-A-110AT, and two experimental alloys: 6% aluminum, an all-alpha alloy, and 30% molybdenum, an all-beta alloy. Tables, graphs, diagram. 7 ref. (Q7, Ti)

684-Q. Torsion Prestrain and the Fatigue Strength of RC-55 Titanium Alloy. J. G. Kaufman and E. D'Appolonia. *American Society for Testing Materials, Preprint No.* 73, 1955, 14 p.

Rotating-beam fatigue tests. Torsional prestrain ranged from 5 to 60% of the torsional strain to failure. Data from tests of torsionally prestrained specimens compared with data from tests of otherwise similar specimens that had not been prestrained. Tables, graphs. 10 ref. (Q1, Q7, Ti)

685-Q. Anisotropy of Fatigue Strength of a Steel and Two Aluminum Alloys in Bending and in Torsion. W. N. Findley and P. N. Mathur. *American Society for Testing Materials, Preprint No.* 75, 1955, 15 p.

A somewhat similar variation of the fatigue strengths with orientation relative to the texture was observed for all three metals. Fatigue strength in bending decreased as the orientation changed from longitudinal to diagonal to transverse; and the fatigue strength in torsion was nearly constant at all three orientations. Tables, micrographs, diagrams, graphs. 30 ref. (Q1, Q5, Q7, Al, AY)

686-Q. The Behavior of Long Helical Springs Under Fluctuating Load. C. L. Staugaitis and H. C. Burnett. *American Society for Testing Materials, Preprint No.* 76, 1955, 6 p.

Machine was constructed for testing long springs, operating on a guide rod, under fluctuating compressive loads. Results of tests on this machine showed that wear on the spring due to the guide rod reduced the life of the long springs far below that of the short springs tested at the same stress range. Photograph, tables, graphs, micrographs. (Q7, Q28, SG-b)

687-Q. The Effect of an Anodic (HAE) Coating on the Fatigue Strength of Magnesium Alloy Specimens. J. A. Bennett. *American Society for Testing Materials, Preprint No.* 77, 1955, 5 p.

Bending fatigue tests of coated and uncoated specimens were made in machines of the constant-amplitude-of-deflection type. Results showed that the coating caused a significant reduction in fatigue strength even when the stress on the coated specimens was calculated on the assumption that all the load was supported by the underlying metal. Table, diagrams, graph, micrographs. (Q7, L19, Mg)

688-Q. Effect of Strain-Rate History on the Creep Behavior of an Alloy Steel at 800° F. H. A. Lequear and J. D. Lubahn. *American Society for Testing Materials, Preprint No.* 78, 1955, 5 p.

Quickly strained specimens had about 30 times the creep rate of slowly strained specimens immediately after being brought to a common stress. Graphs, table. 3 ref. (Q3, AY)

689-Q. Effect of Time and Temperature on Impact and Tensile Properties of Hot-Rolled Low-Carbon Steels During Strain-Aging. F. Garofalo, G. V. Smith and D. C. Marsden. *American Society for Testing Materials, Preprint No.* 79, 1955, 11 p.

Upon straining and aging at 75° F., or exposing strained and fully aged material at 450° F., a pronounced shift in the notch-impact transition-temperature range to higher temperatures was found. Tables, graphs, micrographs. 10 ref. (Q6, Q27, N7, CN)

690-Q. Mechanical Properties of a Magnesium Alloy Under Biaxial Tension at Low Temperatures. Edward Paxson, Joseph Marin and L. W. Hu. *American Society for Testing Materials, Preprint No.* 80, 1955, 13 p.

Properties in both simple and biaxial tension were obtained at various low temperatures. Biaxial tensile properties were determined by the bulge-type test, using a thin circular plate clamped at the edges and subjected to lateral hydrostatic pressures. Photographs, diagrams, graphs. 15 ref. (Q27, Mg)

691-Q. Strength of Bent Copper Tube. G. S. Sangdahl, Jr., and W. M. Baldwin, Jr. *American Society for Testing Materials, Preprint No.* 81, 1955, 20 p.

Provides evidence that, in spite of thinning of the wall, the bursting strength of copper tube is not impaired by bending. Graphs, diagrams, tables, photographs. 14 ref. (Q23, Cu)

692-Q. A Hardness Conversion Table for Copper-Beryllium Alloy Strip. G. R. Gohn. *American Society for Testing Materials, Preprint No.* 82, 1955, 10 p.

For material in the as-rolled condition having a tensile strength within the range of 70,000 to 132,000 psi., conversion values, based upon material having the same tensile strength, are given for diamond pyramid hardness numbers taken with both a 2½ and a 5-kg. load, as well as for the Rockwell B, and Rockwell superficial 30T scales. Tables, graphs. (Q29, Cu)

693-Q. Certain Departures From Plastic Ideality at Large Strains. H. A. Lequear and J. D. Lubahn. *American Society for Testing Materials, Preprint No.* 87, 1955, 20 p.

Studies on high-purity copper to relate the results of creep and tension tests. Diagram, graphs. 17 ref. (Q3, Q27, Cu)

694-Q. A Diameter Gage and Dynamometer for True Stress-Strain Tension Tests at Constant True Strain Rate. G. W. Powell, E. R. Marshall and W. A. Backofen. *American Society for Testing Materials, Preprint No.* 88, 1955, 13 p.

Design of instruments, typical data from tests on type-301 austenitic stainless steel at several strain rates at temperatures of 20 and −196° C. Diagrams, circuit diagram, photograph, graphs. 10 ref. (Q27, SS)

695-Q. An Axial Loading Creep Machine. M. H. Jones and W. F. Brown, Jr. *American Society for Testing Materials, Preprint No.* 89, 1955, 7 p.

Factors influencing the eccentricity of loading in tension testing and a creep machine designed to reduce bending stresses in tension creep to a minimum. Circuit diagram, diagrams, graphs, photographs. 6 ref. (Q3, Q27)

696-Q. A Remotely Operated Extensometer. R. G. Berggren and J. C. Wilson. *American Society for Testing Materials, Preprint No.* 90, 1955, 4 p.

A sensitive extensometer for use in remotely controlled tension testing of radioactive metallic specimens. Diagram, circuit diagram, photograph. (Q27)

697-Q. Reproducibility of Charpy Impact Test. David E. Driscoll. *American Society for Testing Materials, Preprint No.* 93d, 1955, 5 p.

To demonstrate the reproducibility and reliability of the test, a special heat of steel was cut to make 18,000 blanks and heat treated to three energy levels. These specimens were used to make tests on various machines. Graphs, tables. (Q6)

698-Q. The Effect of Heat Treatment and Structure Upon Creep Properties of Nimonic Alloys Between 750 and 950° C. W. Betteridge and R. A. Smith. *American Society for Testing Materials, Preprint No.* 94d, 1955, 11 p.

Results of tests on nickel-chromium-cobalt alloys hardened with titanium and aluminum show that differences in the stress-rupture properties at 750° C., whether due to differences in content of hardening elements or to differences in heat treatment, are maintained at all temperatures up to 950° C. Tables, graphs, micrographs. 9 ref. (Q3, Q4, Ni)

699-Q. Tension and Torsion Tests on Nimonic Alloys at High Temperatures. E. D. Ward and W. G. Tallis. *American Society for Testing Materials, Preprint No.* 94e, 1955, 11 p.

Data obtained in conventional tension and torsion tests, at temperatures from 20 to 1000° C. (70 to 1830° F.), on the nickel-chromium-base alloy Nimonic 75 and 80A and the nickel-chromium-cobalt-base alloys Nimonic 90 and 95. Table, graphs. (Q1, Q27, Ni)

700-Q. Compression-Creep Properties of Several Metallic and Cermet Materials at High Temperatures. L. A. Yerkovich and G. J. Guarnieri. *American Society for Testing Materials, Preprint No.* 94f, 1955, 23 p.

Investigations to develop suitable test apparatus and obtain compression-creep data for various metals and cermets. Tables, diagrams, photographs, graphs. 12 ref. (Q3)

701-Q. Longitudinal Impact Tests of Long Bars With a Slingshot Machine. W. Ramberg and L. K. Irwin. *American Society for Testing Materials, Preprint No.* 93a, 1955, 14 p.

Slingshot machine for making impact tests at the National Bureau of Standards. Results obtained from these tests on bars of steel and copper. Diagrams, photograph, table, graphs. 21 ref. (Q6, CN, Cu)

702-Q. The Impact Tube: A New Experimental Technique for Applying Impulse Loads. George Gerard. *American Society for Testing Materials, Preprint No.* 93c, 1955, 16 p.

Development of an experimental technique for applying loads of an impulsive nature to diaphragms or plates of various shapes. Tables, diagrams, photographs, graphs. 14 ref. (Q6)

703-Q. Influence of Boron on Cast Cobalt-Base S-816 Alloy. W. E. Blatz, E. E. Reynolds and W. W. Dyrkacz. *American Society for Testing Materials, Preprint No.* 94a, 1955, 8 p.

Cast cobalt-base alloys with stress-rupture properties at 1650° F., equivalent to those of S-816 alloy at 1500° F., were developed. Graphs, table, micrographs. (Q4, Co)

704-Q. Effect of Rare Earth Additions on the High-Temperature Properties of a Cobalt-Base Alloy. J. E. Breen and J. R. Lane. *American Society for Testing Materials, Preprint No.* 94c, 1955, 9 p.

Improvements in the high-temperature mechanical properties of a typical cobalt-base alloy were achieved by the addition of rare earths as misch metal. Tables, graphs, photograph. 10 ref. (Q general, EG-g, Co)

705-Q. Interaction of Friction and Temperature at the Chip-Tool Interface in Metal Machining. F. F. Ling and Edward Saibel. *ASME, Transactions,* v. 77, July 1955, p. 693-700.

An approximate analysis of the interface temperature, or cutting temperature, for linear friction-temperature characteristics and small rake angles, for orthogonal metal machining. Graphs, diagrams. (Q9, G17)

706-Q. The Thermal Barrier—Structures. N. J. Hoff. *ASME, Transactions,* v. 77, July 1955, p. 759-763.

Problems encountered are thermal buckling, thermal stresses, creep buckling and creep failure in tension. Graphs, photograph. 4 ref. (Q3, Q25)

707-Q. Failure of a Large Welded Oil-Storage Tank. *British Welding Journal,* v. 2, June 1955, p. 254-263.

Failure was of the 'brittle fracture' type. Studies of analyses, mechanical properties, microstructures and erection procedures. Diagrams, photographs, tables, graphs. (Q26, K1, CN)

708-Q. Effect of Various Stress-Relieving Treatments on the Behaviour of Welded and Notched Mild-Steel Specimens Under Impact Loading. G. Coates. *British Welding Journal,* v. 2, June 1955, p. 266-275.

Impact tests on notched steel bars into which residual welding stresses were introduced. A comparison between effectiveness of various stress-relieving treatments in improving impact performance. Heat treatment at 650° C. shown to have a greater influence than the other methods of stress relief. Diagrams, graphs, tables, photographs, micrographs. 6 ref. (Q6, J1, CN)

709-Q. Effects of Hydrogen at High Pressures on the Mechanical Properties of Metals. I. Apparatus, Procedures, and Preliminary Results. H. C. Van Ness and B. F. Dodge. *Chemical Engineering Progress,* v. 51, June 1955, p. 266-271.

Embrittlement, not hydrogen attack, appears in steels and other alloys at as low as 2000 atmospheres pressure at room temperature. Tests made up to 4000 atmospheres and to 475° C. show austenitic stainless steel to be most suitable. Tables, diagrams, photographs, micrographs. 11 ref. (Q23, SS)

710-Q. Cumulative Damage in Fatigue: A Method of Investigation Economical in Specimens. John C. Levy. *Engineering,* v. 179, June 10, 1955, p. 724-726.

On the assumption that the scatter of a series of results is due to local conditions pre-existing within each particular specimen, it was presumed that a specimen which showed an unduly long, or an unduly short, life under one applied stress would have shown a similarly long or short life under a different level of stress. Graphs, table. 14 ref. (Q7)

711-Q. The Liability to Fatigue Failure of Aluminium-Alloy Structures. Tibor Haas. *Engineers' Digest*, v. 16, May 1955, p. 253-257.

An approach to the problem through the use of program-loading fatigue testing machines. Photographs, micrographs, graphs, diagrams. 13 ref. (Q7, Al)

712-Q. The Effect of Nitrides and Ternary Intermetallic Compounds on the Young's Modulus of Some Aluminium Alloys. N. Dudzinski. *Institute of Metals, Journal*, v. 83, June 1955, p. 444-448 + 1 plate.

Various binary and ternary aluminum alloys were prepared by chill-casting or sintering and extrusion, and their elastic properties investigated. It was found that the presence of nitrides of aluminum, chromium, magnesium, iron, vanadium and titanium caused an appreciable increase in Young's modulus. Tables, micrographs. 10 ref. (Q21, Al)

713-Q. Plastic Deformation of Aluminium-3.5% Copper Alloy Single Crystals. K. M. Carlsen and R. W. K. Honeycombe. *Institute of Metals, Journal*, v. 83, June 1955, p. 449-454 + 1 plate.

Long crystals of an aluminum-3.5% copper alloy, prepared by the strain-anneal method, enabled a comparison to be made of specimens of identical orientation after different heat treatments. Graphs, micrographs. 10 ref. (Q24, M26, Al)

714-Q. The Significance of Microhardness Testing. A. P. Miodownik. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, June 1955, p. 258-262.

Deviations and scatter encountered in microhardness testing at low loads examined, causes attributed to mechanical and physical characteristics of the testing instrument, operational factors and the microstructure of the specimen. Diagrams. 47 ref. (Q29, M27)

715-Q. Fatigue Life of Airplane Structures. Bo Lundberg. *Journal of the Aeronautical Sciences*, v. 22, June 1955, p. 349-402; disc., p. 403-413.

A survey of the various aspects of the fatigue of complete airplane structures, together with numerical applications. Graphs, tables, photographs. 64 ref. (Q7)

716-Q. Effect of Atomic-Pile Radiation on the Elastic Modulus of an Austenitic Steel. A. Charlesby, N. H. Hancock and H. C. Sansom. *Journal of Nuclear Energy*, v. 1, June 1955, p. 264-279 + 1 plate.

A sensitive method designed for measuring changes in the elastic modulus of a metal during irradiation in an atomic pile. Photographs, tables, graphs, diagram, circuit diagram. (Q21, AY)

717-Q. Materials Engineering File Facts. How Some Elements Affect Steel. *Materials & Methods*, v. 41, June 1955, p. 139.

Relative effects of various elements on steel properties are indicated in table form. Table. (Q general, ST)

718-Q. The Effect of Chromium Plating on the Fatigue Strength of Steel. C. Williams and R. A. F. Hammond. *Metal Industry*, v. 86, May 27, 1955, p. 435; disc., p. 435-438.

Results of tests to determine fatigue strength of chromium-plated steels at varying heat treatment temperatures. (To be continued.) (Q7, Cr, ST)

719-Q. Adaptation of Bergsman Microhardness Tester to American Optical Metallograph. E. W. LaRocca. *Review of Scientific Instruments*, v. 26, June 1955, p. 590-591.

Advantages of the combined system are its simplicity, speed and improved accuracy, and reduction in wear of moving parts. Photograph, diagrams. (Q29)

720-Q. Precision Measurement of Diamond Indentors for Rockwell Hardness Testing. F. R. Tolmon and Joyce F. Hall. *Sheet Metal Industries*, v. 32, no. 338, June 1955, p. 447-451.

Development of methods for the measurement of the cone angle and tip radius of diamond indentors and a brief statement of experience gained in the inspection of indentors during the past few years. Diagrams, micrographs. 1 ref. (Q29)

721-Q. Stress Probing—A Rapid Method for Stress-Surveying. N. Gross and P. H. R. Lane. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 1-8.

Method of determining stresses in structural members or pressure components which can be subjected to cyclic loading. Photographs, graphs, diagrams. 6 ref. (Q25)

722-Q. High-Speed Universal Fatigue Testing Machine. Verification of Statically Calibrated Mechanical-Optical Dynamometer. M. Russenberger and G. Földes. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 9-20.

Working principles and applications of fatigue testing machine. Use of a statically calibrated mechanical-optical dynamometer as a load indicator for dynamic tests. Photographs, diagrams. (Q7)

723-Q. Prediction of Fatigue Failures in Aluminum Alloy Structures. C. R. Smith. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 21-28.

Predictions for a part having a given theoretical stress concentration factor and loading condition. Residual strain calculations. Diagrams, graphs. 7 ref. (Q7, Al)

724-Q. Allowable Stresses for Thin Metal Structural Elements at Elevated Temperatures. E. A. Zeitlin. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 29-44.

Typical elastic constants at elevated temperatures are summarized for 18-8 steel, Inconel X and titanium. Curves displaying the variation of several effective moduli with stress given. Graphs, tables, photographs. 14 ref. (Q25, SS, Ni, Ti)

725-Q. Dynamic Stress Measurements in Gas Turbines. R. A. Berger and A. W. Brunot. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 45-54.

Use of high-temperature strain gages. Photographs, diagrams, graphs. (Q25)

726-Q. Tests of the Conducting Paper Analogy for Determining Isopachic Lines. W. F. Stokey and W. F. Hughes. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 77-82.

Studies of a bar having a centrally located hole, loaded in tension, and for a square plate with compressive loads applied at opposite corners. Photograph, graphs. 4 ref. (Q25)

727-Q. The Moiré Method—A New Experimental Method for the Determination of Moments in Small Slab Models. F. K. Ligtenberg. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 83-98.

Determination of the stress distribution in laterally loaded plates. Graphs, diagrams, photographs. 15 ref. (Q25)

728-Q. New Progress in Our Knowledge About the Moment Distribution in Flat Slabs by Means of the Moiré Method. C. G. J. Vreedenburgh and H. van Wijngaarden. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 99-114.

Experiments, carried out with small slab models, to find maximum slab moments simulating circumstances met in practice, i.e., taking into account the correct shape of column head and drop panel, the presence of marginal beams and other discontinuities in the construction, various load systems, etc. Diagrams, photographs. 6 ref. (Q25)

729-Q. An Analysis of Plastic Behavior of Metals With Bonded Birefringment Plastic. J. D'Agostino, D. C. Drucker, C. K. Liu and C. Mylonas. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 115-122.

Sheets of photo-elastic material were bonded to metal parts to provide a means of measuring the plastic strains in the surface of the metal. Diagrams, photographs. 6 ref. (Q25)

730-Q. Epoxy Adhesives and Casting Resins as Photoelastic Plastics. J. D'Agostino, D. C. Drucker, C. K. Liu and C. Mylonas. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 123-128.

Results on the elastic and photoelastic properties of epoxy resins: Armstrong C-1, C-2, C-4, C-6, C-9, Cycleweld C-14, Araldite CN501, CN502. Tables, graphs, photographs. 9 ref. (Q25)

731-Q. Experiments on Composite Models With Applications to Cemented Joints. C. Mylonas. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 129-142.

Photo-elastic analysis of composite structures. Diagrams, photographs, graphs, table. 20 ref. (Q25)

732-Q. Isochromatic Fringe Sharpening and Fringe Multiplication in Photoelasticity. D. Post. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 143-156.

Experimental techniques for obtaining an isochromatic pattern that exhibits several times as many fringes as the conventional pattern. Diagrams, graphs, photographs, table. (Q25)

733-Q. Quantitative Three-Dimensional Photoelasticity. M. M. Leven. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 157-172.

Evaluation of degree of accuracy to be expected from use of normal or tangential slices in determining two-dimensional stress distributions on the free surfaces of three-dimensionally stressed models into which the stresses have been fixed or "frozen". Photographs, diagrams, tables, graphs. 15 ref. (Q25)

734-Q. Elimination of the Transient Strain Fluctuations Which Result From Longitudinal Impact of Bars. J. M. Krafft. *Society for Experimental Stress Analysis, Proceedings*, v. 12, no. 2, 1955, p. 173-180.

Studies of nature and origin of strain waves; ways to eliminate them in impact and collision testing. Diagrams, graphs, table. 11 ref. (Q6)

735-Q. Creep in Bonded Electric Strain Gages. H. Matlock and S. A.

Thompson. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 181-188.

Room-temperature creep tests. Creep of considerable magnitude (as much as 16% of the applied strain) observed. Diagrams, graphs, photograph. 11 ref. (Q3, Q25)

736-Q. Bending of Rotating Beams. J. B. Tiedemann, T. E. Paradue and I. Vigness. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 189-200.

Mild steel cylinders, while rotating about their axes, were bent transversely by forces applied perpendicular to their lengths. Diagrams, graphs, table. 5 ref. (Q5)

737-Q. New Apparatus for Study of Deformation of Clamped Circular Plate Loaded With Lateral Pressure. W. H. Hoppmann, II. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 201-206.

Bolts normally used to provide edge clamping in plate tests of this type have been made unnecessary by use of a lever device for producing clamping pressures through a uniform centering head. A device is also provided for assuring that the peripheral load on the edge of the circular plate be uniform. Photograph, diagrams, graph. 7 ref. (Q24, Q25)

738-Q. Interatomic Bond Strength and Static Distortions in Crystals of Alloyed Ferrite. V. A. Il'ina and V. K. Kritskaya. *Henry Brutcher Translation No.* 3511, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 100, no. 1, 1955, p. 69-72.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 388-Q, 1955. (Q24, M26, J general, Fe, Mo, Ce, Mn, Nb, V)

739-Q. (English.) **Fatigue of Metals—Our Knowledge and the Deficiencies in Our Knowledge.** P. L. Teed. *Metalen,* v. 10, no. 10, May 31, 1955, p. 147-151.

Effect of surface treatment on fatigue properties. Tables. 67 ref. (To be continued.) (Q7)

740-Q. (English.) **Studies of Fatigued Railway Rails. I. Decision on the Degree of Fatigue of Railway Rails by a Magnetic Flaw Detector.** Ichiro Konishi, Minoru Kawamoto, Hideo Miki, Masao Adachi, Bunji Kondo, Jin-ichi Takamura, Yoshiji Niwa and Hisao Goto. *Kyoto University, Engineering Research Institute Technical Reports,* v. 5, no. 2, Mar. 1955, p. 19-52.

Relation between magnetic flaw detecting record of rails and dynamic character and fatigue or breakage of business track rails. Photograph, graphs, diagrams, tables, micrographs. 5 ref. (Q7, S13)

741-Q. (Czech.) **Micro-Examination of Dynamic Fatigue.** Petr Skulari and Vladivoj Ocenasek. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 279-284.

Suppositions for the practical use of the examination and results obtained for aluminum and its alloys under alternating dynamic loads. Physical principles of fatigue related to material in annealed and hardened conditions. Graphs, micrographs, diagrams, table. 9 ref. (Q7, Al)

742-Q. (Czech.) **Effect of Tungsten Upon Tendency to Temper Brittleness.** Josef Cadek. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 285-293.

Effect of tungsten on the transition temperature of chromium, chromium-vanadium and chromium-nickel steels. Graphs, table, photograph. 19 ref. (Q23, AY, W)

743-Q. (French.) **Studies of the Solid State at High Temperature Carried Out by Means of Ultrasound.** Piero Giorgio Bordoni. *Journal de physique et le radium,* v. 16, no. 4, Apr. 1955, p. 285-291.

Elastic and inelastic properties of metals in the vicinity of their melting point; relation between increase of temperature and the values of Young's modulus and the shear modulus. Graphs, tables. 18 ref. (Q21, Q22)

744-Q. (French.) **Influence of Temperature on the Poisson Coefficient of Refractory Steels.** Louis Raymondin. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 93-104.

Poisson coefficient obtained from data based on combined torsion and bending tests. Influence of a structural change on Poisson coefficient. Diagrams, tables, photograph, graphs, micrographs. 12 ref. (Q21, AY)

745-Q. (German.) **Adaptation of the General Buckling Formula to the Conditions Prevailing in Aluminum Structural Parts.** K. Sutter. *Aluminium,* v. 31, no. 5, May 1955, p. 215-217; disc., p. 217-218.

Formula to compute the resistance of aluminum bars to torsion, bending, or localized buckling under compressive stress. Graph, photograph. 1 ref. (Q1, Q5, Q28, Al)

746-Q. (German.) **High Creep-Resistant Cast Aluminum Alloys With Magnesium and Silicon.** H. Vosskühler. *Aluminium,* v. 31, no. 5, May 1955, p. 219-222.

Data on creep-stress resistance and other mechanical properties of aluminum alloys with 5 to 6% magnesium, 1.7 to 2.0% silicon and about 0.5% copper. Tables, graphs. 7 ref. (Q3, Al)

747-Q. (German.) **The Present Status of Measuring Stresses With X-Rays.** Viktor Hauk. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 275-278.

Factors to be considered in the X-ray method of measuring stresses in metals; advantages of measuring lattice constants and stresses with the counting-tube goniometer. Graphs, tables. 28 ref. (Q25, M26)

748-Q. (German.) **A Dimensionless Characteristic Factor for the State of Flow of Solids.** Th. Pöschl. *Osterreichisches Ingenieur-Archiv* v. 9, no. 1, 1955, p. 22-24.

When determining factors which influence the state of flow of solids, the density must be excluded because the inertia forces in these materials vanish against the cohesive forces. Furthermore it is necessary to introduce the creep rate instead of the strain in Hooke's law. The "viscosity" of solids will then come out as a quantity of the same dimension as the viscosity of liquids. Graph. (Q24)

749-Q. (German.) **Properties of Steel as to Its Behavior in Welded Constructions.** E. Houdremont and H. J. Wiester. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 16-23.

Behavior of iron under mechanical stress; effect of stress distribution, stress velocity, temperature and structure; economic aspects in the choice of structural steels; weld stresses. Photographs, tables, graphs. 21 ref. (Q25, K general, ST)

750-Q. (German.) **Safety and Quality in Different Types of Welded Construction.** K. Klöppel. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 38-65.

Analyses of the causes of weld failures; factors to be considered in the choice of structural steels; effect of treatment of steels and weld joints on strength of welded structure. Photographs, micrographs, tables, diagrams, graphs. 24 ref. (Q23, K general, ST)

751-Q. (German.) **Correct and Incorrect Design of Weld Constructions.** F. W. Griese. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 89-100.

Practical considerations of nature and shape of material, notch effects, type of seam, effect of heterogeneous torsional rigidity and ductility on strength of structural part, elastic and plastic deformations, rigidity with respect to general design. Diagrams, photographs. 10 ref. (Q general, K general)

752-Q. (German.) **The Hardness of Metals. Relationship Between Hardness and Tensile Strength.** E. Kappler. *VDI Zeitschrift,* v. 97, nos. 15-16, May 15, 1955, p. 479-485.

Mathematics of the elastic and plastic deformations of ball-impression hardness testing; plastic behavior of slightly cold worked materials; equations of state of plastic deformations from Brinell hardness; tensile correlation of Brinell hardness to tensile test. Graphs, diagram. 5 ref. (Q27, Q29)

753-Q. (Russian.) **Contact Stresses and Fatigue Fractures of Babbitt Bearings for Automobiles and Tractors.** M. I. Baulin. *Avtomobil'naia i traktotrnaia promyshlennost',* 1955, no. 5, May, p. 17-19.

Babbitt linings tested for fatigue by repeated bending and compression accompanied by the force of friction on the surface of the material. Patterns of crumbling and cracks are established. Photographs, diagrams. (Q7, SG-c)

754-Q. (Russian.) **Contemporary Problems of the Theory of Plasticity.** A. A. Il'iushin. *Moskovskogo Universiteta Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* 1955, nos. 4-5, Apr.-May, p. 101-113.

Theories of small elasto-plastic deformations, plastic flow, creep of metals, strength of structural materials and concrete, etc. 45 ref. (Q23, Q24, Q3)

755-Q. (Russian.) **Wear of Cutters With Mineral-Ceramic Disks.** V. I. Zhikharev. *Stanki i Instrument,* v. 26, no. 5, May 1955, p. 14-16.

Factors affecting cutter life, such as density of grain packing and homogeneity of ceramic material; four classifications derived, based on grain structure and size; wear of cutters in connection with machining of various steels, brass, copper, etc. Micrographs, graphs. (Q9, G17, ST, Cu)

756-Q. (Swedish.) **A Comparison Between Impact Test Pieces According to Schnadt and to Charpy.** Cyrill Schaub. *Jernkontorets Annaler,* v. 139, no. 5, 1955, p. 326-346.

Comparison between these types of test pieces based on determinations of the position of the lower boundary of the transition range, defined as the highest temperature at which no single impact value exceeds 2 kg.-m. per sq. cm. Diagrams, photographs, graphs, tables. 9 ref. (Q6)

757-Q. (Pamphlet.) **Effect of Hydrogen on the Mechanical Properties of Titanium and Titanium Alloys.** Summary Report Under Contract no. DA-33-019-ORD-938. G. A. Lenning, C. M. Craighead, and R. I. Jaffee. PB 111568, 83 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C $2.25.

On various high-purity and commercial-purity specimens, hydrogen is shown to be an impurity which must be kept under control to obtain maximum advantage. The mechanism of hydrogen embrittlement of titanium and alpha alloys differs from that of alpha-beta alloys. (Q23, Ti)

758-Q. (Pamphlet.) **Hydrogen Contamination in Titanium and Alloys. I. Hydrogen Embrittlement in Alpha-Beta Titanium Alloys.** PB 111620. 185 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $4.75.

Hydrogen contamination in alpha-beta alloys can cause low ductility in slow strain rate, room-temperature tensile tests, and premature brittle fracture in room-temperature rupture tests. (Q23, Ti)

759-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings,** (Annual Volume), v. 12, no. 2, 1955, 206 p. Society for Experimental Stress Analysis, Central Square Station, P. O. Box 168, Cambridge 39, Mass.

Individual papers are separately abstracted. (Q general)

R

Corrosion

263-R. Acid Corrosion Inhibition by High Molecular Weight Nitrogen-Containing Compounds. Raymond A. George and Norman Hackerman. *Corrosion,* v. 11, June 1955, p. 249-253; disc., p. 254.

Adsorption from benzene solution onto steel powder and the effect of this treatment on the reactivity of the steel in aqueous acid solution determined. Graphs, tables, 15 ref. (R10, ST)

264-R. Use of the Pearson Bridge in Corrosion Inhibitor Evaluation. E. J. Simmons. *Corrosion,* v. 11, June 1955, p. 255-260.

Basic operation of the Pearson bridge and a circuit for measurement of electrode potentials of remote electrodes in the presence of current flow described. Photograph, graphs, diagrams. 3 ref. (R10)

265-R. Control of Internal Corrosion of a Products Pipe Line System. P. L. DeVerter and A. W. Jasek. *Corrosion,* v. 11, June 1955, p. 261-265; disc., p. 265-266.

Considers the matter of controlling internal corrosion in a pipe-line system and reports experience with two control methods. Tables, diagram. 8 ref. (R10)

266-R. The Effect of Cobalt on the High Temperature Oxidation of Nickel. S. F. Frederick and I. Cornet. *Electrochemical Society, Journal,* v. 102, June 1955, p. 285-291.

Nickel-cobalt alloys of high purity, in sheet form, were oxidized in air at temperatures ranging from 800 to 1400° C. to determine rate of oxidation. Tables, graphs, micrograph. 14 ref. (R2, Ni, Co)

267-R. The Difference Effect on Aluminum Dissolving in Hydrofluoric and Hydrochloric Acids. M. E. Straumanis and Y. N. Wang. *Electrochemical Society, Journal,* v. 102, June 1955, p. 304-310.

Positive difference effect was observed during dissolution of high-purity aluminum coupled with platinum in 0.05, 0.1, 0.25, 0.5, 0.75, 1.0 and 2.0 hydrofluoric acid at 25° C. The effect was directly proportional to the galvanic current up to 60 milliamp. per sq. cm., being nearly independent of the concentration of the acid. Tables, graphs, diagram. 22 ref. (R6, Al)

268-R. Mathematical Studies of Galvanic Corrosion. II. Coplanar Electrodes With One Electrode Infinitely Large and With Equal Polarization Parameters. James T. Waber and Marshall Rosenbluth. *Electrochemical Society, Journal,* v. 102 June 1955, p. 344-353.

Expressions for potential and current density distribution were derived for two mathematically similar corrosion problems: tiny anodes buried in infinite cathodes, and tiny foreign cathodic inclusions in a metal. Table, graph, diagrams. 15 ref. (R1)

269-R. Bolt Materials for Underground Use. *Gas Age,* v. 115, June 2, 1955, p. 38-39.

Addition of small amount of copper, nickel or chromium appears to offer promise. Some bolt materials can be protected against corrosion by making them cathodic to the structures which they fasten. Photographs, table. 3 ref. (R8)

270-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 47, June 1955, p. 91A-92A.

Procedures for stress-corrosion tests. Photographs, diagrams. (R1)

271-R. Electrochemical Principles of Metallic Coatings. I. Electrochemical Principles of Corrosion. L. L. Shreir. *Industrial Finishing (London),* v. 8, May 1955, p. 261 + 4 pages.

Dry and wet corrosion; potentials of corroded metals; electrochemical cells. Tables, diagrams. 13 ref. (R1)

272-R. Of What Use Are Chemical Treatments in Controlling Corrosion? S. T. Powell and L. G. von Lossberg. *Mechanical Engineering,* v. 77, June 1955, p. 495-498.

An evaluation of corrosion inhibitors now being offered widely for the solution of numerous problems in the field of steam-generating equipment. Diagram, table, graphs. (R10)

273-R. When Does Cathodic Protection Pay Out? Dean C. Glass. *Pipe Line Industry,* v. 2, June 1955, p. 37-38.

Survey of pipe line companies shows some surprising results as to the cost and pay-out of cathodic protection. Tables. (R10)

274-R. Mechanism of Water Pipe Corrosion. Rolf Eliasson and James C. Lamb, III. *Water and Sewage Works (Reference and Data Edition),* v. 102, June 1, 1955, p. 107R-112R.

Corrosion cells and their formation; rate and distribution of corrosion. Diagrams, tables, graphs. (R4)

275-R. (French.) **Use of Polarization Curves for the Study of Corrosion and Protection of Iron in the Presence of Chlorides. Phosphatization and Oxidizing Phosphatization.** Anwar Mahmoud Abd El Wahed and Marcel Pourbaix. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 19, 1954, 8 p.

Influence of different quantities of disodium phosphate and potassium chromate on the behavior of iron and different steels in the presence of chlorinated solutions of bicarbonate. Tables, graphs, photographs. 7 ref. (R10, R11, ST, Fe)

276-R. (French.) **Contribution to the Chemical Study of the Corrosion of Copper in Sodium Chloride Solutions.** W. Feitknecht and W. Schütz. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 327-334.

Observations on aspect of underlying metal after dissolution of the corrosion layers. Rate of etching and its dependence upon concentration. Micrographs, photographs, graphs, tables. 10 ref. (R5, Cu)

277-R. (German.) **Technical Problems of V_2O_5.** K. Konopicky. *Brennstoff-Chemie,* v. 36, nos. 9-10, May 11, 1955, p. 151-155.

Effect of V_2O_5 on furnace linings and metal parts. Graphs, tables, photographs. 63 ref. (R9, V)

278-R. (German.) **Filiform Corrosion—a New Type of Corrosion.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 165-168.

Appearance and explanation of formation mechanism of filiform corrosion. Photograph, micrographs, diagram. 5 ref. (R2)

279-R. (Italian.) **Behavior of Various Inhibitors in Galvanic Corrosion.** G. Bombara and F. Gianni. *Rivista dei Combustibili,* v. 9 no. 4, Apr. 1955, p. 297-313.

Evaluation of inorganic inhibitors by means of galvanic polarization curves. Diagrams, tables, graphs. 7 ref. (R10)

280-R. Report of Committee A-5 on Corrosion of Iron and Steel. *American Society for Testing Materials, Preprint No.* 4, 1955, 48 p.

Results of atmospheric corrosion tests on wire, wire products and structural shapes. Proposed tentative specifications for zinc-coated steel chain-link fence fabric; zinc-coated (galvanized) iron or steel sheets, coils and cut lengths; 1.25 oz. ordered coating (pot yield) zinc-coated (galvanized) iron or steel roofing sheets; and zinc-coated (galvanized) steel tie wires. Tables. (R3, S22, L16)

281-R. Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys. *American Society for Testing Materials, Preprint No.* 7, 1955, 15 p.

Tentative recommended practice for conducting acidified copper sulfate test for intergranular attack in austenitic stainless steel and for boiling nitric acid test for corrosion-resisting steels. Micrographs, table. (R11, SS)

282-R. The Atmospheric Corrosion of Rolled Zinc. E. A. Anderson. *American Society for Testing Materials, Preprint No.* 91a, 1955, 9 p.

Corrosion of zinc in the atmosphere is controlled by three principal factors: frequency of rain and dewfall, acidity of moisture, and rate of drying. Tables. 5 ref. (R3, Zn)

283-R. Effect of Natural Atmospheres on Copper Alloys: 20-Year Test. A. W. Tracy. *American Society for Testing Materials, Preprint No.* 91b, 1955, 10 p.

Corrosion resistance of 11 copper alloys exposed to industrial, marine and rural atmospheres over a period of 20 yr. Evaluation is based on weight loss measurements and changes in mechanical properties of sheet specimens. Tables, graphs. 7 ref. (R3, Cu)

284-R. The Atmospheric Corrosion of Copper—Results of 20-Year Tests. D. H. Thompson, A. W. Tracy and John R. Freeman, Jr. *American Society for Testing Materials, Preprint No.* 91c, 1955, 11 p.

Eleven brands of copper, in the form of sheet and wire, were exposed for 20 yr. to four outdoor atmospheres, and the effect of corrosion evaluated by loss in weight and strength and gain in electrical resistance. Tables. 5 ref. (R3, Cu)

285-R. Corrosion Fatigue of Low-Carbon Steel Welded Joints. A. M. Abd-El-Wahed. *British Welding Journal,* v. 2, June 1955, p. 247-253.

Corrosion fatigue of 0.15% carbon steel, with sodium chloride solution as the corrosive medium. All-weld-metal specimens and specimens from the heat-affected zone were included in the tests. Diagrams, graphs, tables, micrographs, radiograph. 8 ref. (R1, Cn)

286-R. Nionel Reference Sheet. II. W. Z. Friend. *Chemical Engineering Progress,* v. 51, June 1955, p. 296.

Corrosion behavior in several media. Comparisons with other alloys in 85% phosphoric acid. (To be continued.) (R6, Ni)

287-R. Special Corrosion Problems of Electric Utility Systems. C. F. Avila and A. B. Jones. *Corrosion,* v. 11, July 1955, p. 291-294.

Causes of several cases of corrosion in the outside plant of electric utilities and remedies adopted for mitigation, including corrosion problems involving corrosion cracking, galvanic action, ground line corrosion of standpipes, water pockets, horizontal surfaces, joints, concrete corrosion of lead, nitrous oxide attack where corona forms. Specifications and details for construction and protection of a zinc-sprayed subway transformer tank. Photographs, tables, diagrams. (R general)

288-R. Carbon Anode Installed in Electric Cable Conduit. Howard L. Davis, Jr. *Corrosion,* v. 11, July 1955, p. 295-298.

Description of high ampere-year impressed anode consisting of graphite rods connected to an insulated header wire. Photographs, diagram, tables, graph. (R10, Pb)

289-R. Construction Materials for Liquid Sodium Systems. E. G. Brush. *Corrosion,* v. 11, July 1955, p. 299-302; disc., p. 302-303.

Resistance of alloys to attack by sodium. Selection of materials of construction that will give satisfactory service in high-temperature sodium systems. Diagrams, graphs, micrographs. (R5, T25, Na)

290-R. Severe Pitting of Stainless (18-8) Steel in Hot Chloride Dye-Baths. Frank N. Speller. *Corrosion,* v. 11, July 1955, p. 303.

Details of attack on welded and cast stainless dyeing equipment. Addition of about 500 p.p.m. sodium nitrate or sodium chromate to the dye bath and scouring water before salting minimized further damage. Micrograph. (R6, R10, SS)

291-R. Filiform Corrosion Products on Iron Immersed in Brine. P. F. Thompson and K. F. Lorking. *Corrosion,* v. 11, July 1955, p. 309-311.

A new type of filiform corrosion pustule observed on steel test specimens immersed in a commercial refrigerating brine containing chromate as a corrosion inhibitor. These filaments were secondary corrosion products growing from primary hemispherical pustules on the metal surface. Mechanism of the growth of the filaments. Micrographs. 6 ref. (R6, R10, Fe)

292-R. Note on "Inverted Relief" in Photographic Illustrations. Neil S. Dempster. *Corrosion,* v. 11, July 1955, p. 312-314.

Points to errors in the orientation of photographs illustrating pitting or blistering forms of corrosion which result in incorrect relief perception by the reader. Suggests photographing specimens illustrating pitting and blistering phenomena so that the shadow falls toward the bottom of the paper. Photographs, micrographs. (R2)

293-R. Cast Irons in High Temperature Service. Richard J. Greene and Frederick G. Sefing. *Corrosion,* v. 11, July 1955, p. 315-321.

Oxidation resistance of cast irons in grate bars and furnace doors. Graphs, micrographs, photographs, tables. 5 ref. (R2, CI)

294-R. On the Passivity of Iron. Karl Friedrich Bonhoeffer. *Corrosion,* v. 11, July 1955, p. 304-308. (Translated from *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 77-81.)

Previously abstracted from original. See item 113-R, 1953. (R10, Fe)

295-R. Magnesium Anodes in a Chemical Plant. Oliver Osborn. *Corrosion Technology,* v. 2, June 1955, p. 170-173.

Use of magnesium anodes in structures handling large volumes of sea water and brine, both static and in motion. Diagrams, photographs. 1 ref. (R10, R4)

296-R. Corrosion in the Tannery. F. E. Humphreys. *Corrosion Technology,* v. 2, June 1955, p. 174-176.

Metals used for different tanning processes and methods of protecting structural steelwork. Photographs. 21 ref. (R5, L26, SG-g, CN)

297-R. Corrosion in the Petroleum Industry. II. F. H. Garner and A. R. Hale. *Corrosion Technology,* v. 2, June 1955, p. 177-180.

Corrosion of condensing and cracking equipment. Attack of pipes and tanks by sulfuric and phosphoric acids. Photographs. 9 ref. (To be continued.) (R7, R6)

298-R. The Effect of Hydrochloric Acid on the Corrosive Nature of Combusion Gases Containing Sulphur Trioxide. R. W. Kear. *Journal of Applied Chemistry,* v. 5, May 1955, p. 237-242.

Mild steel probes studied from 27 to 150° C.; a corrosion peak exists between water and acid dew-points. Acid and chlorine increase corrosion. Graphs, diagrams. 7 ref. (R9, CN)

299-R. Metallic Materials Resistant to Molten Zinc. Webster Hodge, R. M. Evans and A. F. Haskins. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 824-832.

Refractory boron compounds are shown to resist corrosion by molten zinc. Coatings were made from ferroboron and manganese boron by several methods: welding, hard facing, and pack diffusion. Diagram, tables, photographs, micrographs, graph. 23 ref. (R6)

300-R. Water Conditioning for Scale and Corrosion Control. Richard B. Conlon. *Paint Industry Magazine,* v. 70, May 1955, p. 34-39, 45-46.

Classifies water by source and describes scaling and corrosion control methods in boiler, cooling, and process waters. Table, graphs, photographs. (R4)

301-R. The Five Per Cent Salt Spray and Its Acetic Acid Modification. Wardley D. McMaster. *Plating,* v. 42, July 1955, p. 904-906.

Use of the acetic acid salt spray as a practical means of evaluating plating quality. Photographs, tables. 4 ref. (R11, L17, Cr, Cu, Ni)

302-R. Tests Lick Condenser-Tube Corrosion. William D. Bissell. *Power,* v. 99, July 1955, p. 102-104.

Analysis of the trouble, testing program and progress that has been made. Photograph, diagrams. (R11, R4)

303-R. (French.) **Electrochemical Behavior of Manganese. Potential-pH Equilibrium Diagram of the System Mn-H_2O, at 25° C.** A. M. Moussard, J. Brenet, F. Jolas, M. Pourbaix and J. van Muylder. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 18, 1954, 7 p.

General properties of manganese, its oxides and solutions; behavior of manganese dioxide in voltaic cells. Diagram. 18 ref. (R5, Mn)

304-R. (German.) **The Stress Corrosion of Brass and Its Prevention by Silicon.** H. Steinle. *Metall,* v. 9, nos. 11-12, June 1955, p. 492-495.

Effect of silicon content and degree of cold working on susceptibility to stress corrosion and hardness of brasses. Photographs, graphs, micrographs, tables. (R1, Q29, Cu)

305-R. (Polish.) **Oxide Scaling on Nickel.** Lucjan Czerski and Franciszek Franik. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 43-68.

Mechanism of scale formation at high temperatures; chemical composition and microstructure of scale at various depths. Experimental method involves use of a "witness" metal (platinum wires) in following the scaling process. Diagrams, micrographs, tables. 24 ref. (R2, M27, Ni)

306-R. (Russian.) **Corrosive and Electrochemical Behavior of Electropolished Aluminum.** I. L. Rozenfel'd and P. V. Shchigolev. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 668-670.

Role of oxide film in the increased corrosion resistance of electropolished aluminum; advantages of electropolished over mechanically polished aluminum, subjected to sodium sulfate and sodium chloride solutions; effect of copper, stainless steel, zinc and magnesium in contact with aluminum. Cathodic polarization. Graphs. 1 ref. (R10, L13, Al)

S

Inspection and Control

111-S. Direct Reading Spectrometer Speeds Magnesium Production. C. A. Sauer. *Iron Age,* v. 175, June 16, 1955, p. 87-89.

Through the development of direct reading instruments for spectrochemical analysis, tighter control of alloy content in a fraction of the time previously required is possible. Diagrams, graph, photograph, table. (S11, Mg)

112-S. Electron Microscopy Can Aid Machining Research. *Metalworking Production,* v. 99, Apr. 22, 1955, p. 714-715.

Surface roughness indications by an electron beam almost parallel to the material surface. Micrographs. (S15)

113-S. The Preparation and Handling of Intense Radioactive Sources. P. J. Stewart. *Nondestructive Testing,* v. 13, May-June 1955, p. 11-13, 33.

Importance of neutron fluxes and reactor size in the production of radioactive materials. Handling of gamma ray sources for industrial radiography. Photographs. (S19)

114-S. Radiography of Small Castings With High Cobalt or Nickel Content. E. Alfred Burrill. *Nondestructive Testing,* v. 13, May-June 1955, p. 19-21.

Radiographic problems introduced by these castings and development of an economical technique using a 1-million-v. Van de Graaff X-ray generator as the source of penetrating radiation. Photograph, diagram. (S13, Co, Ni)

115-S. Industrial Xeroradiography in 1955. Robert G. Vyverberg, Harold E. Clark and John H. Dessauer. *Nondestructive Testing,* v. 13, May-June 1955, p. 35-40.

Process based on a photoconductive layer which is electrostatically sensitized, exposed to X-rays, and then developed by passing over it an oppositely charged powder to form a visible image. Photographs, diagrams. 9 ref. (S13)

116-S. Non-Destructive Testing. *Railway Locomotives and Cars,* v. 129, June 1955, p. 57-60.

Testing of railroad parts and equipment used to promote safety, improve inspection, give quality control of materials and reduce over-all costs. Photographs. (S general)

117-S. (German.) **Comparison Tests on the Accuracy of the Supersonic Test of Large Forgings.** Werner Türk, Walter Knorr and Klaus Barteld. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 629-633.

Comparison of supersonic and destructive testing by nine separate groups of testers. Diagrams, photographs. 7 ref. (S13, ST)

118-S. (Hungarian.) **Inspection of Metallurgical Products by Ultrasonics.** Pal Réti. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 215-222.

Hungarian experience on ingots, steel rods, large forged pieces, thick-walled tubes and plates. Diagrams, photographs. (S13, ST)

119-S. Report of Committee A-1 on Steel. *American Society for Testing Materials, Preprint No.* 1, 1955, 45 p.

Tentative recommended practices for ultrasonic testing and inspection of heavy steel forgings. Proposed specificaitons for chromium-molybdenum steel plates for boilers and other pressure vessels; alloy steel castings normalized and drawn for high pressure and elevated temperature service, and alloy steel chain. Tables. (S13, S22, CN, AY, SS-h)

120-S. Report of Committee A-3 on Cast Iron. *American Society for Testing Materials, Preprint No.* 3, 1955, 13 p.

Tentative specifications for compositions of various grades of foundry pig iron and methods of testing chilled and white iron castings. Table, diagram. (S22, CI)

121-S. Report of Committee A-6 on Magnetic Properties. *American Society for Testing Materials, Preprint No.* 5, 1955, 21 p.

Proposed revised standard methods for testing magnetic materials, normal induction and hysteresis of magnetic materials, and specifications for flat-rolled electrical steel. Tables. (S22, P16, SG-p)

122-S. Report of Committee B-12 on Non-Ferrous Metals and Alloys. *American Society for Testing Materials, Preprint No.* 9, 1955, 10 p.

Proposed tentative specifications for titanium sponge and fire-refined casting copper. Tables. 3 ref. (S22, Cu, Ti)

123-S. Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. *American Society for Testing Materials, Preprint No.* 12, 1955, 31 p.

Proposed tentative specifications for tellurium-copper rod, threadless copper pipe, copper and copper-alloy forging rod, bar and shapes and seamless copper bus pipe and tubes. Tables. (S22, Te, Cu)

124-S. Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. *American Society for Testing Materials, Preprint No.* 14, 1955, 39 p.

Miscellaneous recommendations affecting standards for light metals and alloys. Tentative specifications for aluminum bars for electrical purposes (bus bars). Tables. (S22, Al)

125-S. Report of Committee B-9 on Metal Powders and Metal Powder Products. *American Society for Testing Materials, Preprint No.* 16, 1955, 12 p.

Tentative specifications for copper-infiltrated iron parts and for metal powder sintered bearings (oil impregnated) of bronze and iron-base mixtures. Tables. (S22, H16, Cu, Fe)

126-S. Report of Committee E-7 on Non-Destructive Testing. *American Society for Testing Materials, Preprint No.* 63, 1955, 23 p.

Proposed tentative method for dry powder magnetic particle inspection. Photographs. (S13)

127-S. Thermocouple Immersion Errors. J. M. Berry and D. L. Martin. *American Society for Testing Materials, Preprint No.* 95, 1955, 8 p.

An attempt is made to distinguish between two types of "immersion" errors. First type occurs when an inhomogeneous portion of a thermocouple (developed, perhaps, at the service temperature) is subjected to a temperature gradient, and the second is related to conduction of heat to or from the hot junction of the thermocouple. Graphs, diagrams, table. 5 ref. (S16)

128-S. New Testing Methods Increase Foundry Efficiency. W. J. Stewart. *Canadian Metals,* v. 18, June 1955, p. 40-42.

Use of X-ray and gamma-ray radiography, magnetic particle, liquid penetrant and ultrasonic waves in nondestructive testing. Diagrams, photographs. (S13)

129-S. British Standards for Aluminium. E. Elliott. *Engineers' Digest,* v. 16, May 1955, p. 221-226.

Standards for aluminum and its alloys for general engineering purposes and for the specialized field of aircraft construction. Tables. 1 ref. (S22, Al)

130-S. Calibration of Temperature Measuring Instruments. *Great Britain National Physical Laboratory, Notes on Applied Science,* no. 12, 1955, 47 p. + 2 plates.

Methods and apparatus used for making routine checks and maintaining working standards. Photographs, graphs, diagrams, tables. (S16)

131-S. Testing and Inspection—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2K-12K.

Review of nondestructive test methods and instrumentation gaging and developments and future prospects. Photographs. (S13, S14)

132-S. Method of Measuring Film Thickness of Solid Lubricants. H. M. McCullough and I. Sheinhartz. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 822-823.

Superficial Rockwell hardness tester can be used as a device for measuring thickness of sprayed graphite and similar coatings at normal and slightly elevated temperatures. Maximum measurable thickness depends on load and diameter of penetrator. Graph. (S14)

133-S. Simple Tests for Identifying Metals by Appearance, Chip Test, and Blowpipe Test. *Linde Tips,* v. 34, July 1955, p. 58-59.

Identification by using appearance of fracture surface, unfinished surface, newly machined surface, chip size, facility of chipping, speed of melting, color change while heating, slag and action of slag given in table form. Table. (S10)

134-S. Where and How Spectrography Can Help You. Howard E. Boyer and Frank E. Fitzgerald. *Materials & Methods,* v. 41, June 1955, p. 95-99.

Flexible and useful tool that has proved its worth in many metal fabricating plants for rapidly identifying and sorting alloys and for determining their composition. Spectrograms, diagram, graphs. (S11, S10)

135-S. Testing the Thickness and Adhesion of Electroplated Coatings. *Mechanical World and Engineering Record,* v. 135, June 1955, p. 256-261.

Coating thickness and quality tested by the B.N.F. jet-test; describes test and apparatus. Diagrams, tables, graphs. 10 ref. (S14, L17)

136-S. Non-Contact Hardness Tester Sorts Castings Magnetically. Milton J. Diamond. *Metalworking Production,* v. 99, June 17, 1955, p. 1091-1092.

Automatic magnetic comparator measures hardness of steel rocker arms for automobile engines at 3000 pc. per hr. Photograph, diagrams. (S10, Q29, CI)

137-S. Study of Some Properties of Stresscoat. A. J. Durelli, S. Okubo and R. H. Jacobson. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 55-76.

Variables influencing the coating behavior and characteristics used to evaluate the coating. Graphs, table. 1 ref. (S13, Q25)

138-S. Weld Quality—"Score-Card" Aids Industrial Control. E. C. Osborne. *Steel Processing,* v. 41, June 1955, p. 363-366.

Charts and control procedures for industrial welding operations. Graphs. (S12, K general)

139-S. Cases of Damage to Steam Turbines and How to Prevent Such Damage. E. Pohl. *Henry Brutcher Translation No.* 3512, 7 p. (Abridged from *Stahl und Eisen,* v. 71, no. 25, 1951, p. 1375-1379.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 72-S, 1952. (S21, Q7, ST)

140-S. Spectroanalysis of Phosphorus in Steel. E. S. Kudelya and A. S. Dem'yanchuk. *Henry Brutcher Translation No.* 3520, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 83, no. 3, 1952, p. 397-398.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 357-S, 1952. (S11, CI, ST)

141-S. (Dutch.) **Reliable Measuring Equipment in Heavy Industry.** R. Smit. *Bedrijf en Techniek,* v. 10, no. 227; *Electronica section,* v. 8, no. 174, May 7, 1955, p. 73, 75, 77.

Use of electronic equipment for measuring temperatures, pressure, thickness, etc. in the heavy metals industry. Photographs, diagrams. 11 ref. (S general)

142-S. (German.) **Materials Testing in Electroplating.** J. Elze. *Metall,* v. 9, nos. 11-12, June 1955, p. 458-465.

Methods of testing metal platings and anodic oxide coatings for thickness, surface condition, porosity, hardness, internal stresses, impurities and electrical properties. Photograph, graphs, diagrams. 11 ref. (S13, S14, S15, L17, L19, P15)

143-S. (German.) **Development of Nondestructive Testing and the Problems of Its Application.** M. Pfender and O. Vaupel. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 24-33.

Nondestructive testing methods; recent developments in preferred methods of testing weld joints; factors to be considered in the use of nondestructive testing methods and in evaluation of test results. Tables, diagrams, photographs, graphs. (S13, K general)

144-S. (German.) **Nondestructive Testing of Materials and Its Limitations.** P. Gayer. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 33-37.

Detection of shallow and deep surface cracks, precipitations and defects in austenitic steels and welds; determination of mutual adhesion of two different materials; comparison of ultrasonic and X-ray tests; preference of using radioactive isotopes over X-rays for testing welded pipelines. Table, photographs. (S13)

145-S. (Polish.) **Use of Radioactive Isotopes in Investigating Nonmetallic Inclusions in Steel for Roller Bearings.** Leonid Andrejew. *Wiadomosci Hutnicze,* v. 11, no. 3, Mar. 1955, p. 82-84.

Slag impurities in steel melted in high-frequency induction furnace. Contamination by particles from the basic lining of the crucible of the induction furnace, by slag particles of the bearing steel melted in a ½-ton arc furnace, and by impurities from the pouring set-up. Tables. (S19, D6, D9, ST)

146-S. (Book.) **1955 SAE Handbook.** 1094 p. Society of Automotive Engineers, 29 West 39 St., New York 18, N. Y.

Standards and recommended practices on steels and iron; nonferrous metals; nonmetallic materials; threads; bolts, nuts, and screws; splines and serrations; bearings; springs; tubing and fittings; electrical equipment; lighting equipment; engines and parts; car, truck, bus equipment; tractors and earthmovers; and marine equipment. (S22)

147-S. (Book—German.) **Ultrasonics and Its Uses in Science and Technology.** Ludwig Bergmann. 1114 p. 1954. S. Hirzel Verlag Stuttgart, Germany. $18.00.

Comprehensive treatise covers the methods of generating, detecting, and measuring ultrasonic frequencies; measurements of sound velocities and absorption in liquids and gases; determination of elastic and elastic-optical constants; and its applications in physics, chemistry, metallurgy, electrochemistry, telecommunications, biology, medicine, architecture, and nondestructive testing. (S general, P10)

T

Applications of Metals in Equipment

75-T. Ceramic Raw Materials for the Welding Electrode Industry. William T. DeLong and Harry F. Reid, Jr. *American Ceramic Society Bulletin,* v. 34, June 1955, p. 183-185.

Functions of an electrode coating, materials used, raw material requirements, current material needs for the industry. Tables, diagrams. (T5)

76-T. Beryllium Copper Cuts Forging Die Costs. George H. De Groat. *American Machinist,* v. 99, June 6, 1955, p. 158-159.

Cast beryllium-copper dies give excellent surface finish in "as-cast" condition, reduces die costs and permits the use of various materials. Photographs. (T5, F22, Cu, Be)

77-T. The Development of Metals in the Aircraft Industry. L. K. Brooks. *Australasian Engineer,* 1955, Apr., p. 51-58.

Processing and applications of aluminum, zinc, other alloys and stainless steels. Tables, photographs. (T24, Al, Zn, SS)

78-T. Aluminium-Alloy Bearings. E. A. G. Liddiard. *Engineers' Digest,* v. 16, May 1955, p. 248-252.

Development of aluminum alloy bearings and reasons for wider applications in the future. Micrographs, graphs, table. 6 ref. (T7, Al)

79-T. Rock Drilling With Hard Metals. *Mechanical World and Engineering Record,* v. 135, May 1955, p. 222-226.

Reviews developments in properties of hard metals and discusses choice of composition and grain size for rock-drilling applications, outlines the problems associated with the steel stem and brazing, considers manufacturing procedure and applications. Micrographs, photographs. 1 ref. (T28, EG-d)

80-T. Powdered Iron Applications. J. A. Roberts and G. O. Altman. *Tele-Tech & Electronic Industries,* v. 14, sec. 1, June 1955, p. 94 + 9 pages.

Manufacturing requirements for types of iron, together with physical and electromagnetic characteristics, for guide utilization coils, tuner cores and direction finders. Photographs, table. 17 ref. (T1, H general, Fe)

81-T. Printed Foil Electronic Components. Hubert L. Shortt and Paul Eisler. *Tele-Tech & Electronic Industries,* v. 14, sec. 1, June 1955, p. 102 + 8 pages.

Utilization of printed materials as aircraft de-icing mats, high-wattage resistors, and temperature sensing elements. Photographs, micrographs. (T1)

82-T. (German.) **Experiments on the Granulation of Cast Iron and Pig Iron.** R. Mitsche and E. M. Onitsch-Modl. *Berg und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, no. 3, Mar. 1955, p. 121-126.

Production of iron granules and shot by pouring molten metal into water. Effects of test conditions on size and shape of the granules. Photographs, tables, diagram. (T2, CI)

83-T. Aluminum in Electrical Engineering. C. H. E. Ridpath. *Aluminium Courier,* 1955, no. 30, June, p. 3-6.

Used in all-aluminum and steel-cored conductors, cables for power, aircraft and communication, gas and oil pressure noses, busbars and many other applications. Table, photographs. (T1, Al)

84-T. Marine Applications. L. M. C. Robinson. *Aluminium Courier,* 1955, no. 30, June, p. 16-18.

Use of aluminum at sea, situation as it exists today, remarks on future progress. Photographs, diagrams. (T22, Al)

85-T. Packaging. J. A. Ambler. *Aluminium Courier,* 1955, no. 30, June, p. 19-21.

Established uses of aluminum in packaging, with some indication of the latest trends. Photographs. (T10, Al)

86-T. Improved Aluminum-Tin Bearing Alloys. E. A. Lancaster. *Canadian Metals,* v. 18, May 1955, pt. 2, p. 44-46.

Developments of high-tin and aluminum-tin for bearing alloys which meet demands of heavy load and high-temperature operation. Photographs, table. 4 ref. (T7, Al, Sn)

87-T. Electrical Contacts in Precious and Special Metals. *Machinery Lloyd (Overseas Ed.),* v. 27, June 4, 1955, p. 79-83.

Applications in industry as solders, photographic materials, fuse wire and electrical contacts. Tables, photographs. (T1, EG-c)

88-T. Postwar Applications of Aluminum in Britain. E. G. West. *Modern Metals,* v. 11, June 1955, p. 38 + 5 pages.

Applications in prefabricated houses and schools, roofing and siding, ships and boats, road transport vehicles, railway cars, farm implements, electrical equipment and containers. Photographs, diagram. (T general, Al)

89-T. Aluminum-Sheathed Power Cable. W. A. Del Mar and E. J. Merrell. *Power Apparatus and Systems,* 1955, no. 18, June, p. 292-298; disc., p. 298-304.

Methods of fabrication used in producing communication and power cable such as billet extrusion, joining of aluminum sheath, use of sinking dies, cable bend testing and corrosion protection of wipes and sheath. Photographs, graphs, tables. 17 ref. (T1, Al)

90-T. Engine Bearings of Aluminum. D. B. Wood. *Railway Locomotives and Cars,* v. 129, July 1955, p. 47, 49.

Basic advantages of solid aluminum bearings and some points of consideration in design. Photographs. (T7, Al)

91-T. Aluminium Roofing and Cladding. H. W. Johnson. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 425-432.

Progress in field of roofing and cladding of structures. Use in making tiles, wall facings and spandrels. Photographs, diagrams, tables. (T26, Al)

92-T. Seventy-Five Years of Sulzer High-Pressure Pipe Lines. *Sulzer Technical Review,* 1954, no. 4, 48 p.

Developments in materials, manufacture, joining and use of large pipelines and penstocks. Photographs, diagrams, graphs. (T4)

93-T. The Present Position of Aluminium in Shipbuilding. E. G. West. *Welding and Metal Fabrication,* v. 23, June 1955, p. 194-203.

Alloys for marine use, design factors, economic considerations, working and fabricating methods, properties. Photographs, diagram, table. (To be continued.) (T22, Al)

94-T. Fabrication of Resistance Alloys. William L. Stryker. *Wire and Wire Products,* v. 30, June 1955, p. 668-671, 726.

Production of alloys used in the electrical appliance industry. Photographs. (T1, SG-q)

95-T. (German.) **The Use of Killed Basic Converter Steel for Oil Field Pipes.** Ewald Baerlecken and Werner Scheurer. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 718-721.

Notched bar impact bending test on DVM specimens in the nonaged and aged condition for temperatures between −140 and +20° C.; in addition, tensile and welding tests on oilfield pipes made of basic converter steel killed by aluminum (DTP steel) and of killed openhearth steel. Possibilities of using killed basic converter steel instead of openhearth steel for oil field pipes. Tables, graphs. (T28, CN)

96-T. (Book.) **Building Materials—Their Elasticity and Inelasticity.** M. Reiner, editor. 560 p. 1954. North-

Holland Publishing Co., Amsterdam, Holland. $12.25.

Thirteen papers discussing the many diverse and complex materials that exhibit rheological properties and the way in which rheological knowledge has to be applied to a variety of problems of technical importance. Papers are individually abstracted. (T26, Q general)

V

Materials

General Coverage of Specific Materials

172-V. Some Metallurgy and Physics of Germanium. L. W. Davies. *Australasian Engineer,* 1955, Apr., p. 66-71.

Description of the semiconducting electrical properties of germanium and techniques for the production of single-crystal germanium alloys with the properties required for the fabrication of junction transistors. Diagrams, photographs. (P15, T1, Ge)

173-V. The History and Development of Aluminium and Its Alloys. A. von Zeerleder. *Engineers' Digest,* v. 16, May 1955, p. 217-220.

Processes of reducing aluminum, its applications, analysis of its alloys. (C general, T general, Al)

174-V. Titanium: A New Growth Industry. *Monthly Business Review,* 1955, June, p. 3-6, 10.

Uses and advantages, titanium ores, manufacture of titanium sponge, melting and rolling. Map, graph, table. (Ti)

175-V. Permanent Magnet Steels and Alloys. F. Knight. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 95-147.

Advances made in permanent magnet technique; diffusion and precipitation hardening alloys; physical and mechanical properties; permanent magnet design; testing and demagnetizing; applications; micropowder magnets. Photographs, graphs, tables, diagrams. (SG-n)

176-V. (French.) The Platinum Group Metals. Edmund Merriman Wise. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 265-286.

Industrial and jewelry uses, alloy compositions, properties. Tables, diagrams, graphs, photographs. 61 ref. (EG-c)

177-V. (German.) Structure, Mechanical Behavior, and Standardization of Gray Iron in the Light of a Divariant System. A. Collaud. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 151-161.

Effects of heat treatment and correlations between the different mechanical properties; possible metallurgical measures of improving the properties of gray iron, proposition on the standardization of its quality. Tables, graphs. (CI)

178-V. Nionel Reference Sheet. I. W. Z. Friend. *Chemical Engineering Progress,* v. 51, May 1955, p. 66.

Description, composition, chemical and mechanical properties of this new alloy. (To be continued.) (Ni)

179-V. Iron and Steel—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2D-21D.

Past, present and future developments in furnaces, alloys, galvanizing, rolling and raw materials. Photographs. (D general, L16, F23, Fe, ST)

180-V. Nonferrous Metals—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2H-17H.

Developments in properties, processing and applications. Photographs. (EG-a)

181-V. French Aluminium Industry. Maurice Moyal. *Metal Industry,* v. 86, June 17, 1955, p. 509-511.

Raw materials extraction, fabrication, new projects. Photographs. (Al)

182-V. Materials Handbook. VIII. Properties of Molybdenum. Harry Majors, Jr., R. H. Wallace, G. E. Wendell, and R. T. Webster. *U. S. Atomic Energy Commission,* CRD-A19-27, 1953, 26 p.

Mechanical, physical and fabrication properties. Tables, graph. 17 ref. (Mo)

183-V. A Review of Aluminium Alloy as Engineering Materials. J. R. Handforth. *Welding and Metal Fabrication,* v. 23, June 1955, p. 204-210.

Alloy compositions and properties forming methods; applications. Tables, photographs, graphs. (Al)

184-V. Molybdenum. A High-Temperature Structural Metal. William M. Fraser and Robert T. Freeman. *Westinghouse Engineer,* v. 15, July 1955, p. 130-133.

Properties, working, machining, joining, applications, future prospects. Photographs, diagrams. (Mo)

185-V. (Pamphlet.) The Fabrication and Properties of 16-Alfenol—A Non-Strategic Aluminum-Iron Alloy. PB 111552. 27 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

It can be fabricated in sheets and tape in thickness down to 0.0003 in., opening the possibility of applications taking advantage of its other useful properties as well as its magnetic qualities. (Al)

186-V. (Book.) Metallurgy of the Rarer Metals. Pt. III. Manganese. A. H. Sully. 305 p. 1955. Academic Press, Inc., 125 East 23rd St., New York 10, N. Y.

History; occurrence; production; alloys; properties; applications. (Mn)

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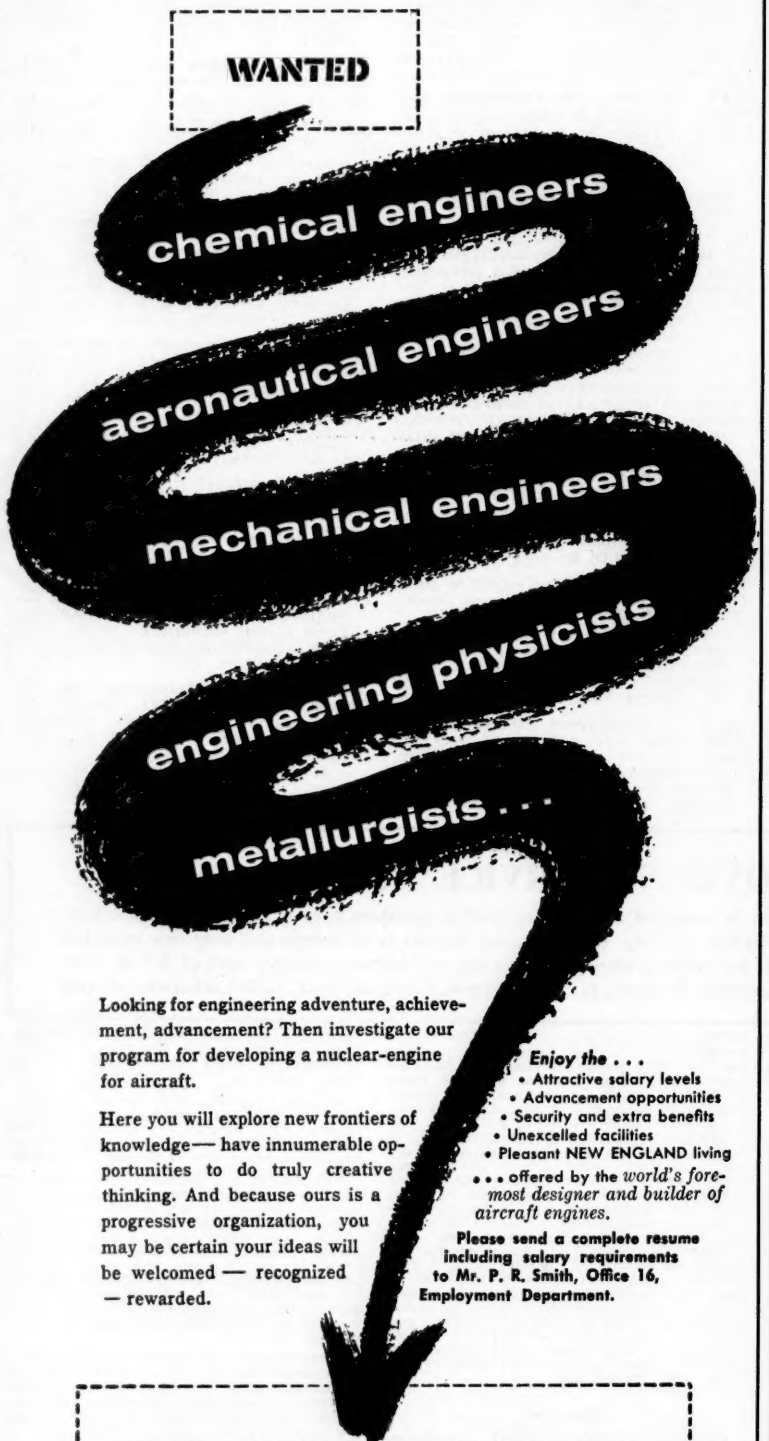

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PRODUCTION METALLURGIST: To conduct laboratory tests and develop local process specifications. Provide engineering information for operations in foundry, heat treating, metal fabrication, welding, magnaflux, etc. To examine defective parts to determine reasons for failure, and to provide engineering information relative to materials substitutions. Grade GS-9, salary $5060 per year. Submit Standard Form 57, obtainable at first-class post offices, to: Industrial Relations Dept., Building 183, U. S. Naval Air Station, Alameda, Calif.

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SALES ENGINEER: With metallurgical background, for Canadian division of industrial furnace manufacturer. Box 8-95.

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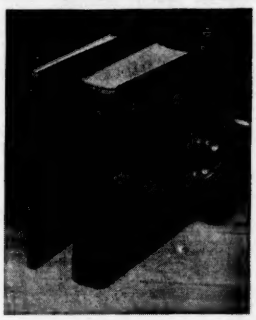

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METALLURGICAL ENGINEER: Recent graduate, B.S. degree, age 33, married. Twenty months in steel plant in metallography, quality control and specifications. Desires position in ferrous, nonferrous or any producing or manufacturing industry with opportunity to learn in the field of metallurgy. Prefers South or Texas. Box 8-115.

DIFFRACTION PHYSICIST — METALLOGRAPHER: Age 28, married, family, five years industrial metallurgical and solid state research experience in two of America's largest metallurgical research institutions. Presently supervising group in X-ray and electron diffraction, metallography, optical and electron microscopy. Interested in research work. Box 8-120.

FIELD ENGINEER: For an industrial plant or design and engineering firm. Thorough knowledge of manufacturing and erection procedures in heavy machines and equipment. Capable administrator, ability to coordinate work for efficient performance of assignment, either in U. S. or foreign. Qualified to assume high responsibility. Will travel or relocate. Box 8-125.

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PHYSICAL METALLURGIST: X-ray diffraction. B.S., M.S. degrees, age 29, married. Six years varied industrial research experience. Desires responsible position involving application of X-ray diffraction and metallography to metallurgical problems. Presently employed. Cleveland area desired but will consider other locations. Please include complete resume of position. Box 8-135.

STEEL MILL SUPERVISOR: Technical graduate. Familiar with all phases of hot rolling of steel. Good production and quality. Has proven ability to increase production with present equipment. Graduate study in metallurgy. Will relocate. Age 44, married, family. Box 8-140.

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